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Nongrain Feeds

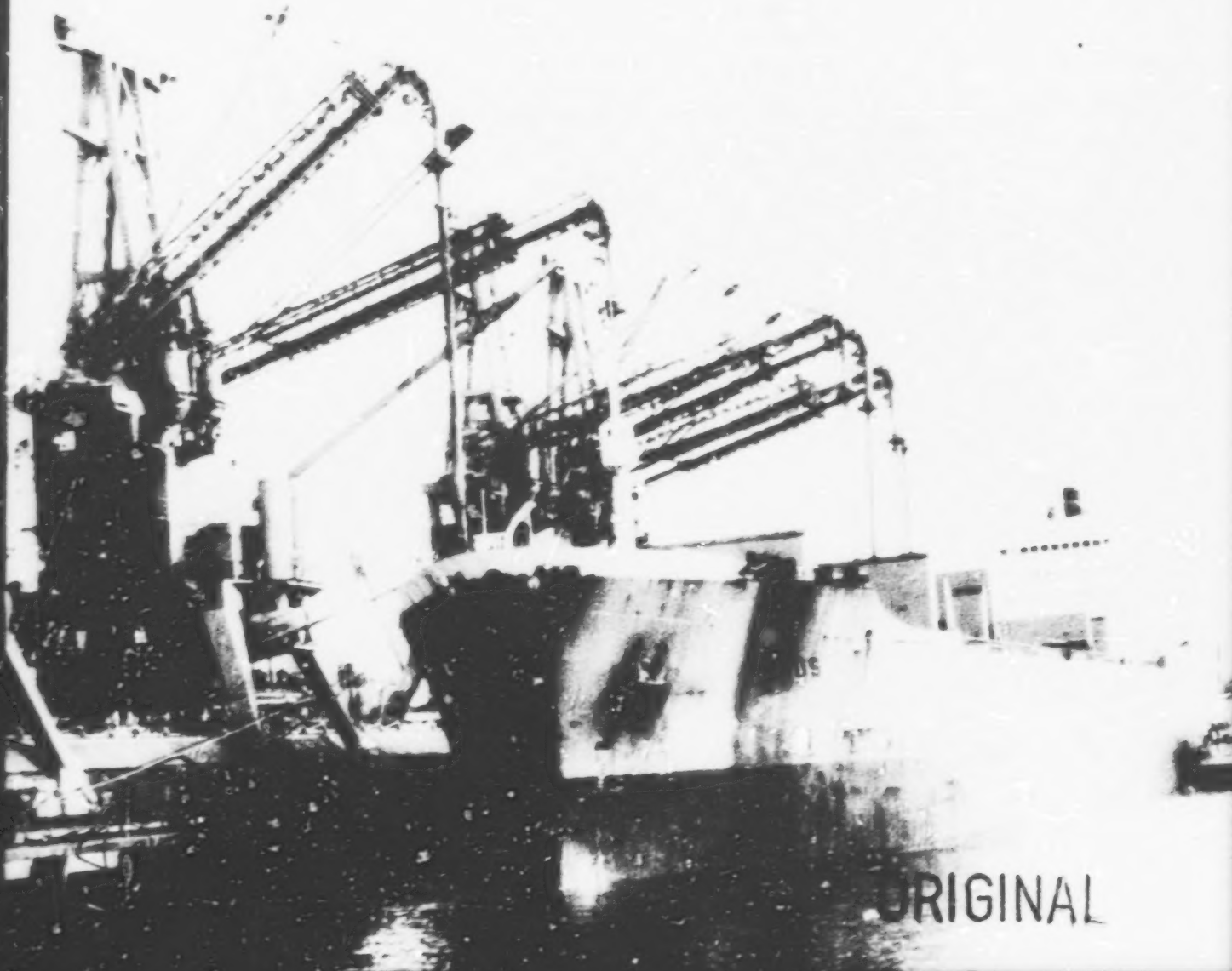
EC Trade and Policy Issues

Stephen C. Schmidt

Walter H. Gardiner

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ABSTRACT

Nongrain feed imports in the European Community (EC) grew rapidly throughout the 1970's and early 1980's due to a shift to more intensive livestock production, increased use of compound feeds, null or low rates of duty on nongrain feeds, and high support prices for domestic feeds. To deal with burgeoning grain surpluses and a budgetary crisis in funding the Common Agricultural Policy, the EC Commission has proposed and implemented various measures to restrain imports of "cereal substitutes." However, several recent studies show that lowering EC grain prices would more effectively increase consumption of EC grains and reduce grain surpluses, than would restricting nongrain feed imports. This report describes these studies, the pattern of EC trade in nongrain feeds, the role of nongrain feeds in the EC's feed-livestock sector, and related policy issues.

Keywords: Nongrain feeds, cereal substitutes, imports, European Community, Common Agricultural Policy, grain surpluses, budget crisis, policy reform, voluntary restraint agreements, import restrictions, GATT bindings.

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SUMMARY

Nongrain feed imports in the European Community (EC) grew rapidly throughout the 1970's and early 1980's due to a shift to more intensive livestock production, increased use of compound feeds, null or low rates of duty on nongrain feeds, and high support prices for domestic feeds. Most of these nongrain feeds, or so-called "cereal substitutes," are produced outside the EC, particularly in the United States and Thailand, and either compete with or complement EC grains, depending on nutritional content and price.

To deal with burgeoning grain surpluses and a budgetary crisis in funding the Common Agricultural Policy (CAP), the EC Commission has proposed and implemented various measures to restrain imports of certain nongrain feeds. These measures include voluntary restraint agreements on manioc imports, increased import levies on cereal brans, and import ceilings and levies on corn byproduct feeds. The latter measure, not yet adopted, has been a major source of friction between the United States and the EC and will likely be an issue during the Uruguay round of negotiations under the General Agreement on Tariffs and Trade (GATT). Other groups, particularly nongrain feed exporters, EC feed compounders, and livestock producers, contend that the commodity surplus and budgetary problems lie more with high CAP price supports. Several recent studies show that lowering EC grain prices would more effectively increase consumption of EC grains, thus reducing grain surpluses, than would restricting nongrain feed imports.

The nongrain feed, or "cereal substitute," issue highlights the problem of conflicting policies over the CAP, varied interests within the EC, and trade disputes over market access between the EC and exporting countries. EC officials claim that restrictive measures will ease both surplus production and budget expenditures. Restricting certain nongrain feed imports will not ensure that compounders will switch to EC grains. Compounders may instead increase use of other nongrain feeds. Import restrictions without lower grain prices would raise costs to feed compounders, livestock producers, and consumers of livestock products. In addition, exporters of nongrain feeds would likely retaliate against the EC if they were not adequately compensated for the restrictions.

GLOSSARY

Common Agricultural Policy (CAP). The unified farm policy applied by EC members. The CAP deals with agricultural prices, structural improvements to agriculture, and internal and external agricultural trade.

Common Customs Tariff (CCT). The EC's list or schedule of articles of merchandise with the rate of duty to be paid for their importation from non-member or "third" countries.

European Community (EC). An economic and customs union of 12-member countries. The 12-member countries are the 6 original members (Belgium, West Germany, France, Italy, Luxembourg, and the Netherlands) that formed the union in 1958; Denmark, Ireland, and the United Kingdom, which joined in 1973; Greece which joined in 1981; and Portugal and Spain which joined in 1986.

European Currency Unit (ECU). The standard unit for expressing common agricultural prices in the EC. Its value is based on a weighted basket of EC-member currencies. In 1970, 1 ECU = U.S. \$1.02. In 1986, 1 ECU = U.S. \$0.98.

General Agreement on Tariffs and Trade (GATT). An agreement negotiated in 1947 among 23 countries, including the United States, to increase international trade by reducing tariffs and other trade barriers. In 1986, 92 countries belonged to the GATT.

Monetary Compensatory Amount (MCA). MCA's are taxes and subsidies on EC farm trade designed to even out the effect of currency fluctuations.

Threshold Price. A minimum import price set by the EC under the CAP for certain commodities. Certain imports from nonmember countries are subject to a levy which is equal to the difference between the threshold price and the minimum world price at EC ports.

Value-Added Tax (VAT). A tax levied by each member country on domestic consumption. A small percentage (1.4 percent in 1986 and 1987) of the amount collected in each country is claimed by the EC as budgetary revenue.

Conversion Chart

This report uses metric units throughout. Metric tons are referred to as "tons."

1 hectare = 2.47 acres.

1 kilogram = 2.2 pounds.

1 metric ton = 2,204 pounds.

Nongrain Feeds

EC Trade and Policy Issues

Stephen C. Schmidt
Walter H. Gardiner*

INTRODUCTION

Chronic surpluses in the European Community's (EC) cereals and livestock sectors and large budgetary outlays in administering the Common Agricultural Policy (CAP) have sparked interest in policy reform. Certain groups in the EC have attributed these problems to increased imports of certain nongrain feeds, or so-called "cereal substitutes." The belief is that these imported feeds are harmful to the EC budget because they:

- o Reduce feed manufacturers' use of EC grains,
- o Increase storage expenditures and export subsidies for surplus commodities,
- o Reduce revenues by displacing corn imports on which a levy is charged, and
- o Contribute to surpluses of milk and other livestock products.

Pressure from some EC grain producers and the CAP's financial crisis have prompted calls for restricting imported feeds. Other groups, particularly EC feed compounders, livestock producers, and exporters of these feeds, point to high EC grain prices as the reason for the imbalance in the cereals market. These groups have proposed a reduction in EC grain prices as a solution to the problem. They claim that restrictions on imported feeds would not increase grain usage but would lead to increased feeding costs, reduced livestock production, and higher unemployment.

This report describes the role of nongrain feeds in the EC's feed-livestock sector and related policy issues that have emerged in recent years. In light of the sluggish world grain market, the large commodity surpluses in the EC, and the financial burdens of the CAP, the debate over imported feeds is likely to remain a major trade issue between the United States and the EC during the Uruguay round of negotiations of the General Agreement on Tariffs and Trade (GATT).

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CHARACTERISTICS OF NONGRAIN FEEDS

Nongrain feeds in this report refer to certain raw materials used by the EC's compound feed industry in manufacturing feeds for livestock. They are limited to those products that the EC Commission calls "cereal substitutes," which are defined as the following (1, Sept. 2, 1985). 1/

... Feedingstuffs (mainly non-cereals and certain cereal products) which are imported into the Community without import levies, or with low levies which can thus displace Community feedgrains from compound feeds by virtue of their relatively low price.

The label, "cereal substitutes," has been a source of controversy in the EC over the role of nongrain feeds in the manufacture of compound feeds. The debate is whether nongrain feeds substitute for EC grains in animal feeds or whether they replace cereal feed ingredients.

Nongrain feeds include such commodities as manioc, sweetpotatoes, corn gluten feed, wheat bran, and citrus pulp (table 1). They are produced in a number of industrialized and developing countries, and, except for manioc and sweetpotatoes, are byproducts of the food processing industry that have few uses other than for animal feed. In formulating feed rations, the compound feed industry uses computer programs to select among nongrain feeds and other feed ingredients like grains and oilseed meals based on: the type of feed ration to be produced, the nutritional requirements of the ration, and the availability, price, and nutritional value of the feed ingredients. In terms of nutritional value, nongrains vary widely from high-energy feeds like manioc to medium-

1/ Underscored numbers in parentheses refer to items listed in the References section. The date of publication follows underscored number when referring to a publication with multiple issues.

Table 1--Nongrain feeds listed as "cereal substitutes" by the EC Commission

NIMEX code	:	Commodity
07.06.30	:	Manioc
07.06.90	:	Sweetpotatoes
23.02.01	:	Corn and rice brans: maximum 35 percent starch
23.02.09	:	Corn and rice brans: over 35 percent starch
23.02.21	:	Wheat brans: maximum 28 percent starch
23.02.29	:	Wheat brans: over 28 percent starch
23.03.15	:	Corn gluten feed
23.03.81	:	Sugar beet pulp
23.03.90	:	Brewers' and distillers' grains
23.04.06	:	Corn germ cake: less than 3 percent fat
23.04.08	:	Corn germ cake: 3-8 percent fat
23.06.20	:	Grape marc
23.06.50	:	Citrus pulp
23.06.90	:	Other fruit waste

Source: (2).

protein feeds like corn gluten feed. Many of the other nongrain feeds fall into the category of medium-energy, medium-protein feeds.

Manioc has been the most important of the nongrain feeds imported by the EC in recent years, followed by corn gluten feed, wheat bran, citrus pulp, corn germ cake, and sugar beet pulp. The following section describes some of the economic and nutritional characteristics of these nongrain feeds.

Manioc

Manioc, also known as cassava, tapioca, Brazilian arrowroot, or yucca, is a herbaceous shrub or tree with tuberous, starchy roots. It is cultivated throughout the tropics and subtropics of Africa, Asia, and South America where it is grown principally for domestic food use. The main producers are Brazil, Thailand, Zaire, Indonesia, and Nigeria, but only Thailand and Indonesia are significant exporters (table 2). World production of manioc totaled 136.5

Table 2--World manioc production 1/

Region/country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985
	<u>Million tons</u>							
Africa:								
Ghana	: 1.6	2.4	1.8	1.9	2.0	1.7	4.1	2.4
Mozambique	: 2.1	2.3	2.8	2.9	3.3	3.2	3.2	3.2
Nigeria	: 9.1	10.5	11.0	11.0	11.7	10.0	11.8	13.0
Tanzania	: 6.3	3.8	4.6	4.8	5.0	5.4	5.6	5.5
Zaire	: 10.0	11.8	12.2	13.0	14.2	14.6	15.0	15.5
Other	: 15.3	11.7	14.1	13.9	13.6	15.9	16.5	16.9
Total	: 44.4	42.5	46.5	47.5	49.8	50.8	56.2	56.5
Asia:								
China	: .3	.3	3.2	3.3	3.7	3.9	4.1	3.9
India	: 5.2	6.3	5.8	5.8	5.3	5.3	5.9	5.6
Indonesia	: 10.5	12.5	13.5	13.7	13.0	12.2	14.2	14.5
Philippines	: .4	.7	2.3	2.3	2.0	2.0	2.0	2.1
Thailand	: 3.4	6.4	13.6	17.7	17.8	19.0	20.0	20.0
Other	: 1.7	2.3	4.4	4.3	3.7	4.1	4.2	4.4
Total	: 21.5	28.5	42.8	47.1	45.5	46.5	50.4	50.5
South America:								
Brazil	: 29.5	25.8	23.4	24.8	24.1	21.8	21.5	23.1
Colombia	: 1.3	2.0	2.2	2.2	2.0	1.6	1.7	1.7
Other	: 3.5	3.5	3.4	3.4	3.4	3.3	3.5	3.6
Total	: 34.3	31.3	29.0	30.4	29.5	26.7	26.7	28.4
Other	: .7	.9	1.2	1.1	1.1	1.0	1.1	1.1
World	: 100.9	103.2	119.5	126.1	125.9	125.0	134.4	136.5

1/ Root equivalent.

Source: (22).

million tons in 1985, up 35 percent from the 1970 level. Most of the increase is attributed to a sharp expansion in Thailand's output which rose more than sixfold between 1970 and 1985. The northeast is the primary producing region in Thailand and has developed as a result of active encouragement of some trading firms (8, 1980).

Manioc products have a wide range of uses in human food, animal feed, and industrial applications. About 90 percent of world output is used for human consumption. Cooked or raw manioc roots are also fed to swine, poultry, cattle, sheep, and goats in many areas of the world. Manioc is sometimes processed into chips, flour, and pellets for ease in transporting and feeding. Because manioc is very low in protein (2.9 percent, see app. table 1), it is used primarily to supply the energy requirements for livestock. It is also highly deficient in methionine (an essential amino acid), calcium, and vitamin D. As a result, manioc products are usually mixed with high-protein feeds, such as soybean meal or rapeseed meal, to obtain a nutritionally balanced feed ration. Molasses is often added to manioc-based rations to make them more palatable. Manioc is primarily used for feeding swine and poultry and is not particularly important in cattle rations. Limiting manioc to a replacement of not more than one-fourth the grain ration yields the best results in feeding (18).

EC manioc imports increased sixfold during 1970-82, peaking at 8.1 million tons in 1982 (table 3). Imports dropped sharply in 1983 to 4.5 million tons due to EC voluntary restraint (quota) arrangements with major manioc suppliers and a large increase in wheat feeding that year. EC manioc imports rebounded somewhat in 1985 to 6.3 million tons but declined again in 1986 to 5.8 million tons. Thailand is the main supplier of manioc to the EC, accounting for 88 percent of the EC's manioc imports with 5.1 million tons in 1985. Thailand's shipments to the EC have declined about 30 percent since their peak level in 1982, primarily as a result of voluntary restraint agreements. Minor suppliers include Indonesia, China, Brazil, and the Philippines.

The EC's principal manioc importers in 1986 were the Netherlands, West Germany, and Portugal (table 4). The Netherlands imported 3.69 million tons in 1986, or about 63 percent of total EC imports that year. The Netherlands re-exports 30-40 percent of its manioc imports to other EC members, particularly West Germany.

The EC imports manioc in various forms, including chips, pellets, and flour. These products are subject to established trading standards, including a minimum starch content of 60 percent by weight, a maximum raw fiber content of 5 percent by weight, and a maximum moisture content of 14 percent by weight. 2/ Products other than flour enter the EC under Common Customs Tariff (CCT) code (see Glossary) 07.06 A, whereas manioc flour comes under CCT code 11.04 C II. The current import tariff on unprocessed manioc is fixed at 6 percent ad valorem (app. table 2). Imports in excess of quotas established in voluntary restraint agreements with exporters are subject to the import levy for barley plus a small fixed charge (3.02 ECU per ton for pellets). Manioc flour is subject to 1.61 times the import levy for corn plus 20.55 ECU per ton fixed charge.

Manioc pellets come in hard and soft form. Hard pellets are made from flour mixed with a small amount of vegetable oil and, therefore, are more costly to manufacture and transport than soft pellets. Soft pellets tend to disintegrate back into flour during shipment, making them more favorable than hard pellets or

2/ These trading standards are formulated by contracts under the United Kingdom's Grain and Feed Trade Association (GAFTA).

Table 3--EC manioc imports from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	1,000 tons								
Brazil	64	7	12	5	3	3	6	4	14
China	15	4	336	607	440	132	57	78	270
Indonesia	3	314	372	413	286	85	406	553	352
Philippines	--	--	--	--	3	4	3	0	10
Thailand	926	1,873	4,116	5,620	7,348	4,247	4,741	5,681	5,098
Other	344	24	30	32	21	34	44	20	78
Total 2/	1,352	2,222	4,866	6,677	8,101	4,505	5,257	6,336	5,822

-- = Less than 500 tons.

1/ NIMEXE code 0706.30 for 1970-82 and codes 0706.10 and 0706.20 for 1983-86.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 4--EC manioc imports by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	1,000 tons								
West Germany	588	404	1,261	1,324	1,236	737	550	662	685
France	11	146	332	595	643	227	248	281	405
Italy	14	0	99	237	214	100	111	130	76
Netherlands	495	1,232	2,389	3,376	4,686	2,808	3,644	4,705	3,691
Belgium-Luxembourg	244	353	757	974	1,002	513	647	527	229
United Kingdom	NA	7	8	151	303	116	55	29	16
Ireland	NA	0	8	11	11	4	1	1	4
Denmark	NA	0	12	10	6	0	0	0	0
Greece	NA	NA	NA	0	0	0	0	--	1
Spain	NA	NA	NA	NA	NA	NA	NA	NA	183
Portugal	NA	NA	NA	NA	NA	NA	NA	NA	534
Total 2/	1,352	2,222	4,866	6,678	8,101	4,505	5,256	6,335	5,822

NA = Not applicable.

-- = Less than 500 tons.

1/ NIMEXE code 0706.30 for 1970-82 and codes 0706.10 and 0706.20 for 1983-86.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

chips because the flour content permissible in pellet shipments is not yet limited. ^{3/} EC authorities insist that the proportion of disintegrated pellets on arrival should be reduced to below 50 percent. Limiting EC importers to only hard pellets and reclassifying soft pellets under a higher import tariff levy has been proposed. Soft pellets account for most of Thailand's manioc pellet exports, 59 percent of the total in 1983 (52).

Corn Gluten Feed

Corn gluten feed is one of various byproducts from the corn wet-milling process. In this process, the corn kernel is separated into its four principal parts: the germ, containing the oil; the gluten, containing most of the protein; the hull, containing most of the fiber; and the starch. The gluten and fibrous portions are combined to form corn gluten feed. ^{4/}

The supply of corn gluten feed is determined by the demand for the product of primary value, starch, which is further processed into various food and industrial products, including corn sweeteners (high-fructose corn syrup (HFCS) and dextrose) and fuel alcohol (ethanol). Thus, the value of corn to the wet-milling processor is closely related to the sum of the value of primary products and byproducts from corn. ^{5/}

Corn gluten feed is considered a medium-protein feed (22 percent), containing about half the protein of soybean meal but more than double that of corn (app. table 1). It is used mainly as a source of protein in cattle feeds, particularly for dairy cows, and less heavily in swine and poultry rations. The factor limiting corn gluten feed use in swine and poultry rations is the imbalance and absence of certain essential amino acids, which must be compensated with other protein supplements. The relatively high fiber content (8 percent) of corn gluten feed also limits use. The value of corn gluten feed as a feed has been demonstrated up to 10 percent in laying hen rations and 15 percent in swine rations (54).

EC imports of corn gluten feed increased from 598,000 tons in 1970 to 3.7 million tons in 1984, reflecting the expansion of the EC's livestock sector and the strong demand for nongrain feeds (table 5). However, imports dropped about 5 percent in 1985 to 3.5 million tons due to reduced feed demand associated with EC milk quotas and competition from palmkernel meal, copra meal, and grains (1, May 30, 1986). Imports of corn gluten feed rose in 1986 to 4.1 million tons. Most of the increase, however, reflects the inclusion of Spain's and Portugal's trade statistics that year due to their accession to the EC. The United States is by far the largest supplier, accounting for around 95 percent of EC imports in recent years. Argentina and Brazil are minor suppliers, each with about 2 percent of the EC market. While all EC countries import some corn gluten feed, the Netherlands is the leading importer with about half the volume, followed by West Germany and the United Kingdom (table 6).

^{3/} Also, higher processing costs in Europe make manioc imports in chip form less attractive than soft pellets mixed with flour.

^{4/} Wet-milling products, on a percentage dry-yield basis, are starch (67.5), crude corn oil (3.86), gluten meal (5.8), germ cake (3.64), solubles (7.6), fiber (9.5), and other (2.1). Germ cake, solubles, and fiber are usually combined as corn gluten feed (54).

^{5/} In 1983, 1 bushel of corn yielded HFCS valued at \$7.20 and corn gluten feed at 98 cents. HFCS accounts for 80 percent of the total value from a bushel of corn, while corn gluten feed accounts for only 10 percent (38).

Table 5--EC imports of corn gluten feed from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
United States	: 502	: 861	: 2,476	: 2,710	: 2,716	: 3,373	: 3,557	: 3,345	: 3,874
Argentina	: 18	: 35	: 64	: 52	: 47	: 69	: 68	: 81	: 89
Brazil	: 27	: 25	: 35	: 59	: 55	: 63	: 55	: 60	: 62
Other	: 51	: 9	: 21	: 16	: 24	: 61	: 54	: 56	: 72
Total <u>2/</u>	: 598	: 930	: 2,596	: 2,837	: 2,842	: 3,566	: 3,734	: 3,542	: 4,097

1/ NIMEXE code 2303.10 for 1970 and code 2303.15 for other years.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 6--EC imports of corn gluten feed by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
West Germany	: 71	: 205	: 1,004	: 1,081	: 963	: 1,236	: 1,139	: 896	: 900
France	: 0	: 0	: 0	: 29	: 33	: 28	: 39	: 49	: 100
Italy	: 9	: 3	: 49	: 42	: 22	: 49	: 70	: 83	: 134
Netherlands	: 501	: 647	: 1,451	: 1,248	: 1,252	: 1,715	: 1,905	: 1,885	: 1,810
Belgium-Luxembourg	: 17	: 75	: 27	: 40	: 51	: 111	: 168	: 101	: 169
United Kingdom	: NA	: 1	: 58	: 394	: 521	: 402	: 335	: 328	: 361
Ireland	: NA	: 0	: 0	: 1	: 0	: 3	: 29	: 166	: 178
Denmark	: NA	: 0	: 6	: 2	: 1	: 21	: 48	: 33	: 33
Greece	: NA	: NA	: NA	: —	: 0	: 0	: 0	: 1	: 2
Spain	: NA	: NA	: NA	: NA	: NA	: NA	: NA	: NA	: 118
Portugal	: NA	: NA	: NA	: NA	: NA	: NA	: NA	: NA	: 291
Total <u>2/</u>	: 598	: 930	: 2,596	: 2,837	: 2,842	: 3,566	: 3,734	: 3,542	: 4,097

NA = Not applicable.

— = Less than 500 tons.

1/ NIMEXE code 2303.10 for 1970 and code 2303.15 for other years.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Corn gluten feed enters the EC free of both tariffs and levies as a result of the GATT agreement from the 1963-67 Kennedy Round (app. table 2). The volume of corn gluten feed entering the EC was small for many years following this accord but began to increase sharply in the 1970's.

Brans

Brans, or offals, are byproducts of the dry-milling process for grains. They are a mixture of the coarse outer covering of the kernel and some other finely ground materials left after the initial milling process. Brans make up about 50 percent of total wheat millfeeds. Finer grinding can result in less coarse products called middlings, sharps, thirds, or pollards. Middlings, made up of the larger part of the kernel just inside the outer bran covering, the endosperm, and bran particles, usually account for about 45 percent of total wheat millfeeds (18).

Brans are relatively bulky, laxative feeds and are quite palatable to animals except when used as a high percentage in rations. They generally contain more protein (16 percent) than grains but less than oilseed meals. Most of the wheat millfeeds are fed to poultry, swine, and dairy cattle. The bulk of millfeeds from oats, barley, rice, and rye are relatively high in fiber, but the quality of the protein is not as suitable for swine and poultry as wheat millfeeds.

EC wheat bran imports from nonmember sources rose from 1.1 million tons in 1970 to 2.3 million tons in 1976 and dropped off to around 1.7 million tons for the years 1980-83 (table 7). The static level of bran imports during this period indicated market saturation because there are nutritional limits to their incorporation into feeds (1, Feb. 26, 1982). Imports have declined sharply since 1983 to 665,000 tons in 1986. The decline is associated with the EC Commission's increase in import levies on brans since 1982 to help curb their importation.

Argentina is the principal supplier of wheat brans to the EC with 70-75 percent of the trade in recent years. Imports from other suppliers (Canada, Indonesia, and the United States) have dwindled to negligible amounts. The higher import levies and the strong value of the U.S. dollar caused wheat bran from the United States to fall sharply since 1982 to only 1,000 tons in 1985. EC imports of U.S. wheat brans recovered somewhat in 1985 to 15,000 tons as a result of a weaker dollar but still amount to only 2 percent of the market. The Netherlands, Italy, and Belgium-Luxembourg account for the bulk of EC imports of wheat brans (table 8). Greece and Spain do not import wheat brans, and Denmark has dropped out of the market in recent years.

Brans are not bound by GATT arrangements and, therefore, the EC is free to adjust import levies as it desires. CCT heading 23.02 A consists of brans, sharps, and other residues derived from sifting or milling cereals (app. table 2). Subheading 23.02 A I covers brans of corn and rice, and subheading 23.02 A II covers other cereal residues, mainly wheat offals or brans, which are the most significant of the EC's bran imports. These products are subject to import levies based on average levies for wheat, corn, and barley, adjusted by technical coefficients that reflect the relative feed value of brans or sharps to cereals. The feed value of bran is about four-fifths that of barley.

Tables 9 and 10 show how the levy is calculated for brans and sharps. Import levies on brans and sharps are set at the beginning of each month based on import levies and the threshold prices (see Glossary) of the basic grains

Table 7--EC wheat bran imports from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
United States	: 1	74	139	76	186	77	7	1	15
Indonesia	: 0	125	207	158	160	205	76	1	42
Argentina	: 678	588	697	785	784	773	650	670	460
Canada	: 0	206	343	343	311	255	110	3	15
Other	: 394	244	321	342	292	369	158	213	133
Total <u>2/</u>	: 1,073	1,237	1,707	1,704	1,733	1,679	1,001	887	665

1/ NIMEXE code 2302.13 for 1970 and 1975 and code 2302.21 for 1980-86.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 8--EC wheat bran imports by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
West Germany	: 136	296	190	282	317	194	59	10	4
France	: 104	114	75	69	50	128	12	3	3
Italy	: 84	59	241	258	229	309	257	197	200
Netherlands	: 474	319	648	528	437	434	316	220	124
Belgium-Luxembourg	: 275	212	127	113	198	240	166	286	189
United Kingdom	: NA	202	308	332	386	217	89	88	79
Ireland	: NA	13	59	107	104	157	103	83	55
Denmark	: NA	22	59	14	13	0	0	0	0
Greece	: NA	NA	NA	0	0	0	0	0	0
Spain	: NA	NA	NA	NA	NA	NA	NA	NA	0
Portugal	: NA	NA	NA	NA	NA	NA	NA	NA	12
Total <u>2/</u>	: 1,073	1,237	1,707	1,703	1,733	1,679	1,001	887	665

NA = Not applicable.

1/ NIMEXE code 2302.13 for 1970 and 1975 and code 2302.21 for 1980-86.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

(common wheat, barley, and corn). The base value on brans and sharps is calculated by adding the sum of the average daily levy on the basic grains for the first 25 days of the preceding month (253.43 ECU per ton for June 1-25 in table 9) to the sum of the increments in the threshold prices of the basic grains for the previous month and the current month (zero for June-July), which yields the base value (253.43 ECU per ton) for calculating the import levies on brans and sharps. The base value is then adjusted by the technical coefficient corresponding to each product (referenced by its CCT heading) to determine the amount of the import levy for each product (table 10). Products with high starch contents (brans under CCT heading 23.02 A I b and 23.02 A II b) were subject to an import levy of 82.03 ECU per ton on July 1, 1984, which was below that charged for barley (85.10 ECU) and common wheat (105.65 ECU) and above that charged for corn (62.68 ECU).

Citrus Pulp

Citrus pulp, one of various types of fruit wastes, has been fed to livestock with considerable success. Fruit wastes come from three sources: unmarketable

Table 9--Base value calculation for import levy
on brans and sharps, July 1, 1984

Grains	: Average levy : (June 1-25)	: Threshold price increment : (June-July)	: Base value : (Levy + increment)
		<u>ECU per ton</u>	
Common wheat	: 105.65	0	105.65
Barley	: 85.10	0	85.10
Corn	: 62.68	0	62.68
Total	: 253.43	0	253.43

Source: (2).

Table 10--Import levy calculation for brans and sharps, July 1, 1984

Common customs tariff code	: Base value	: Technical : coefficient	: Fixed : component	: Import : levy
	<u>ECU/ton</u>	<u>Percent</u>	- - <u>ECU/ton</u> - -	
Corn or rice brans:				
23.02 A I a	: 253.43	0.14	6	41.48
23.02 A I b	: 253.43	.30	6	82.03
Wheat or other brans:				
23.02 A II a	: 253.43	.14	6	41.48
23.02 A II b	: 253.43	.30	6	82.03

Source: (2).

or damaged commodities; crop residues left in the field; and canning, juicing, or processing wastes.

The citrus industry processes oranges, grapefruit, lemons, limes, and tangerines and is a major producer of byproducts for use as livestock feed. Citrus pulp, in particular, is a residue resulting from the manufacture of citrus juices. The residue is shredded or ground and pressed to remove juices. It can be fed wet if feed lots are close by or dried for storage or shipment. In the drying process, the pulp is initially treated with limestone to tie up the pectin, a compound in pulp that draws water from the air. Once properly dried, the pulp maintains an extremely long shelf life.

Dried citrus pulp is used primarily as an energy source for growing cattle and pregnant heifers. High levels should be avoided in rations for lactating cows because it might depress milk yields. The addition of limestone in the drying process makes it a good source of calcium (2.1 percent) but a poor source of phosphorus (0.13 percent). It is seldom used in nonruminant rations because of the high fiber content (14 percent). If the pulp contains seeds, toxicity problems can develop. Furthermore, levels of 10 percent in chicken rations will depress growth, and levels over 2.5 percent in layer rations may discolor egg yolks (18).

Citrus pulp is the third largest nongrain feed imported by the EC in recent years. EC imports of citrus pulp increased by a factor of 16 between 1970 and 1980, reaching a high of 1.57 million tons (table 11). The sharp rise in imports was due to the boom in dairy concentrate feeding, the rise in demand for feedingstuffs containing sugar, plentiful supplies of citrus pulp, and high prices for EC feeds (1, Mar. 13, 1981). Since 1980, imports declined around 20 percent to 1.26 million tons in 1982 before partially recovering to 1.47 million tons in 1985. The availability of European sugar beet pulp, the strong dollar, and lower demand for dairy concentrate feed are responsible for the soft market for citrus pulp in 1981-85. EC imports of citrus pulp in 1986 declined to 1.24 million tons, their lowest level in recent years as the demand-depressing effects of the dairy quotas offset the benefits of the lower value of the dollar.

The EC's source of citrus pulp has changed significantly. Before 1978, the bulk of supplies came from European countries with large citrus sectors--France, Italy, and Greece. In recent years, more than 90 percent of the citrus pulp has come from outside of Europe, principally from Brazil and the United States, which accounted for around 95 percent of EC imports in the early 1980's. Brazil surpassed the United States in 1982 as the EC's leading supplier of citrus pulp and has maintained that position through 1986.

The Netherlands is by far the largest citrus pulp importer with about 60 percent of the EC total, followed by West Germany and Belgium-Luxembourg (table 12). Citrus pulp is consolidated under GATT and enters the EC free of both tariffs and levies.

Brewers' and Distillers' Grains

Brewers' and distillers' grains are byproducts of the brewing and distilling industries and are used primarily for livestock feed. Brewers' grains are extracted grain residue from the manufacture of beer or ale that is generally dried for ease of handling and storing. They are rather low in energy and high in fiber (15 percent) and, thus, are not used extensively in swine or poultry

Table 11--EC citrus pulp imports from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	1,000 tons								
United States	: 60	263	932	693	567	615	465	424	461
Brazil	: 1	196	609	630	661	772	779	983	716
Other	: 36	21	30	28	37	43	78	60	60
Total 2/	: 97	480	1,571	1,351	1,265	1,430	1,322	1,467	1,237

1/ NIMEXE code 2306.10 for 1970 and code 2306.50 for other years.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 12--EC citrus pulp imports by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	1,000 tons								
West Germany	: 0	10	153	137	138	223	318	353	349
France	: 1	1	36	68	76	77	48	54	93
Italy	: 25	1	--	1	4	7	15	1	22
Netherlands	: 64	416	1,245	1,012	878	954	782	675	614
Belgium-Luxembourg	: 7	14	68	57	81	93	85	104	81
United Kingdom	: NA	2	3	20	44	40	51	52	42
Ireland	: NA	3	13	7	11	15	6	9	20
Denmark	: NA	32	53	50	32	20	16	19	14
Greece	: NA	NA	NA	0	0	0	0	0	0
Spain	: NA	NA	NA	NA	NA	NA	NA	NA	0
Portugal	: NA	NA	NA	NA	NA	NA	NA	NA	2
Total 2/	: 97	480	1,571	1,352	1,265	1,430	1,332	1,467	1,237

NA = Not applicable.

-- = Less than 500 tons.

1/ NIMEXE code 2306.10 for 1970 and code 2306.50 for other years.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

rations. They have a protein content (25 percent) similar to that of corn gluten feed (22 percent) and are used principally in dairy rations as a protein source. Up to one-third of the concentrate mix of dairy rations can consist of dried brewers' grains (18).

Distillers' grains are the residue from the liquor distilling process. Under the British distilling process, the grain residue is separated after the malting stage and is dried for feed. Under the American process, the grain residue is separated after the fermenting and distilling stages and then dried. Distillers' grains are less palatable to livestock than brewers' grains. They are fed principally to dairy cattle as a source of protein (27 percent). They have also proven successful in beef and sheep rations (18).

EC imports of brewers' and distillers' grains grew steadily in 1980-83, following a sharp decline in 1970-75 (table 13). Volume reached 498,000 tons in 1983, before declining the next 2 years as a result of reduced feed demand associated with EC milk quotas and higher relative prices. Imports rebounded sharply in 1986 to 633,000 tons, spurred by larger supplies and a decline in the value of the dollar. The United States is the dominant supplier to the EC market with around 90 percent of the volume. Canada and South Africa provide limited quantities. A substantially higher volume of brewing and distilling byproducts is traded between EC-member countries than with nonmember countries.

All EC countries except Portugal imported some quantities of brewers' and distillers' grains in 1986 (table 14). France is the principal importer followed by the United Kingdom and the Netherlands. Brewers' and distillers' grains have no import levy or tariff as a result of EC concessions in previous rounds of GATT negotiations.

Corn Germ Cake

Corn germ cake, also known as corn germ meal, is the residue from the extraction of oil from the corn germ in the wet-milling process or a byproduct of the drymilling of corn for meal, hominy, or grits. It has an oil content of up to 8 percent. It is used in feeds as an absorbent for liquid ingredients, such as molasses and fish solubles (54). Corn germ cake is characterized by medium protein (20 percent), high fiber (12 percent), and low crude fat (1 percent) (app. table 1).

EC imports of corn germ cake doubled between 1975 and 1980 but have stagnated around 1 million tons since then (table 15). South Africa had been the principal source for EC imports until 1983 when the United States took the lead. Imports from Brazil have grown rapidly since 1975, and Brazil became the second leading source in 1985 behind the United States. Argentina is a minor supplier to the EC, although trade between the two has increased sharply since 1975.

Most EC-member countries import some corn germ cake, although the bulk goes to the Netherlands and West Germany (table 16). The EC has neither an import tariff nor a levy on corn germ cake as a result of previous GATT negotiations.

Sugar Beet Pulp

Sugar beet pulp is a byproduct from the process of extracting sugar from sugar beets. The beets are initially shredded into strips or slices and then soaked in hot water to diffuse the raw juice, which contains 10-15 percent sugar. The residue, or pulp, can be fed wet, dried, or ensiled for later use. It is sold

Table 13--EC imports of brewers' and distillers' grains
from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
United States	: 167	: 37	: 251	: 320	: 334	: 450	: 361	: 395	: 566
South Africa	: 1	: 8	: 9	: 9	: 12	: 7	: 11	: 9	: 8
Canada	: 1	--	: 11	: 16	: 14	: 11	: 5	: 0	: 0
Other	: 284	: 12	: 19	: 20	: 17	: 30	: 39	: 32	: 59
Total <u>2/</u>	: 453	: 57	: 290	: 365	: 377	: 498	: 416	: 436	: 633

-- = Less than 500 tons.

1/ NIMEXE code 2303.90.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 14--EC imports of brewers' and distillers' grains
by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
West Germany	: 25	: 19	: 104	: 103	: 149	: 193	: 151	: 85	: 59
France	: 14	: 11	: 86	: 119	: 70	: 99	: 87	: 112	: 173
Italy	: 71	: 3	: 4	: 12	: 12	: 11	: 11	: 17	: 68
Netherlands	: 288	: 13	: 79	: 72	: 18	: 63	: 84	: 97	: 120
Belgium-Luxembourg	: 56	: 3	: 2	: 2	: 7	: 20	: 6	: 21	: 33
United Kingdom	: NA	: 8	: 14	: 48	: 118	: 105	: 75	: 97	: 142
Ireland	: NA	: 0	: 0	: 8	: 2	: 6	: 0	: 7	: 21
Denmark	: NA	--	--	--	--	: 1	: 1	: 1	: 1
Greece	: NA	NA	NA	: 0	: 0	--	--	--	--
Spain	: NA	NA	NA	NA	NA	NA	NA	NA	: 16
Portugal	: NA	NA	NA	NA	NA	NA	NA	NA	: 0
Total <u>2/</u>	: 454	: 57	: 290	: 364	: 377	: 498	: 416	: 437	: 633

NA = Not applicable.

-- = Less than 500 tons.

1/ NIMEXE code 2303.90.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 15--EC imports of corn germ cake from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
United States	-	49	281	333	342	676	512	440	901
South Africa	-	399	563	536	540	387	251	185	230
Brazil	-	56	193	146	161	203	243	300	262
Argentina	-	1	13	13	19	32	28	31	45
Other	-	20	8	4	1	4	2	2	2
Total <u>2/</u>	-	525	1,058	1,032	1,063	1,302	1,036	958	1,440

- = Not available.

1/ NIMEXE codes 2304.06 and 2304.08.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 16--EC imports of corn germ cake by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
West Germany	-	371	863	662	595	585	458	401	492
France	-	--	158	1	0	1	3	1	--
Italy	-	2	23	16	3	4	10	47	30
Netherlands	-	111	135	261	377	561	429	448	789
Belgium-Luxembourg	-	23	5	25	62	71	46	35	90
United Kingdom	-	18	1	3	11	15	12	11	9
Ireland	-	0	30	65	14	64	78	--	4
Denmark	-	0	0	0	0	0	0	--	--
Greece	-	NA	NA	0	--	0	0	14	22
Spain	-	NA	NA	NA	NA	NA	NA	NA	4
Portugal	-	NA	NA	NA	NA	NA	NA	NA	0
Total	-	525	1,058	1,032	1,062	1,302	1,036	957	1,440

- = Not available.

-- = Less than 500 tons.

NA = Not applicable.

1/ NIMEXE codes 2304.06 and 2304.08.

2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

in shredded or pellet form. Sugar beet pulp is low in protein (8 percent), very high in fiber (21 percent), and low in fat (0.5 percent). It is favored in rations for lactating cows. Molasses is often added to sugar beet pulp to increase the energy content. It is occasionally ammoniated to provide a source of nonprotein nitrogen (18).

EC imports of sugar beet pulp have displayed a cyclical pattern since 1975, reaching a peak of 529,000 tons in 1983 (table 17). The availability of European sugar beet pulp is a major determinant of import demand. Spain and the United States have traditionally been the leading suppliers of sugar beet pulp to the EC market. Yugoslavia has emerged as a major source for EC imports in recent years, while trade with Hungary has declined markedly. Smaller U.S. sugar beet crops and the strong dollar were responsible for reduced EC imports from the United States in 1982-85. Imports of sugar beet pulp from the United States recovered in 1986, however, EC imports from nonmember countries declined because Spain joined the EC in 1986 and was no longer counted as a third-country supplier as in previous years.

Two-thirds of EC-member countries imported some amount of sugar beet pulp in 1986 (table 18). The Netherlands and Italy accounted for the bulk of the trade in the 1980's with as much as 80 percent of the market in 1986. Denmark, a traditional importer, did not import any sugar beet pulp in 1986 while France's imports declined to only 1,000 tons. Sugar beet pulp is bound duty free under GATT arrangements that were negotiated in multilateral trade talks during the 1960's.

NONGRAIN FEEDS AND THE EC FEED SECTOR

Total EC imports of nongrain feeds rose in volume from 3.7 million tons in 1970 to nearly 16.2 million tons in 1982, reflecting a 13.1-percent annual growth rate (table 19). Imports of manioc led the group, followed by corn gluten feed, wheat brans, and citrus pulp. EC imports dropped off somewhat during 1983-86, varying 7-16 percent below the peak level of 1982. Manioc showed the largest absolute decline, followed by wheat brans. Imports of corn gluten feed reached a new high in 1986, but most of the increase was due to the inclusion of imports from Spain, which joined the EC in 1986.

The strong rise in EC imports of nongrain feeds during the 1970's and early 1980's is associated with the shift toward more intensive livestock production systems in the EC, increased demand for compound feeds, duty-free access or low rates of duty for nongrain feeds, and high support prices for EC grains. Furthermore, EC countries with strong currencies (West Germany, the Netherlands, Belgium, and Denmark) have found imported nongrain feeds and oilseed meals to be a relatively cheap source of animal nutrition. Monetary compensatory amounts (MCA's, see Glossary) have been applied to cereals in these countries to insulate farmers from the effects of currency revaluations. This has raised the price of cereals on domestic markets, making it attractive to import nongrain feeds and oilseed meals, which are not subject to MCA's. Efficient port and inland transportation systems and the convenient location of compound feed manufacturers further enhances imported feed use in these countries (36).

Compound Feed Production

As EC farms have gradually increased in size, they have become more specialized. Livestock producers are using greater quantities of purchased feed concentrates

Table 17--EC imports of sugar beet pulp from nonmember suppliers 1/

Supplier	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
United States	-	19	81	146	134	120	51	49	130
Spain	-	64	33	74	135	263	229	218	NA
Yugoslavia	-	20	57	45	90	99	113	179	159
Hungary	-	24	15	16	10	13	1	2	0
Other	-	49	4	3	21	34	23	40	32
Total <u>2/</u>	-	176	190	284	390	529	417	488	321

- = Not available.

NA = Not applicable.

1/ NIMEKE code 2303.81.2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 18--EC imports of sugar beet pulp by member countries 1/

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>1,000 tons</u>								
West Germany	-	51	5	20	45	67	27	15	20
France	-	--	4	7	19	31	5	17	1
Italy	-	15	65	55	90	120	130	199	157
Netherlands	-	97	72	134	205	230	135	144	102
Belgium-Luxembourg	-	4	7	9	2	6	11	44	10
United Kingdom	-	3	12	10	5	31	46	28	18
Ireland	-	0	0	2	1	18	37	34	13
Denmark	-	6	25	48	23	25	26	6	0
Greece	-	NA	NA	0	0	0	0	0	0
Spain	-	NA	NA	NA	NA	NA	NA	NA	0
Portugal	-	NA	NA	NA	NA	NA	NA	NA	0
Total <u>2/</u>	-	176	190	284	390	529	417	487	321

- = Not available.

-- = Less than 500 tons.

NA = Not applicable.

1/ NIMEKE code 2303.81.2/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

Table 19--EC imports of selected nongrain feeds from nonmember suppliers

NIMEXE code	Commodity	1970	1975	1980	1981	1982	1983	1984	1985	1986
		<u>1,000 tons</u>								
0706.30 <u>1/</u>	: Manioc	1,352	2,222	4,866	6,677	8,101	4,505	5,257	6,336	5,822
0706.90	: Sweetpotatoes	12	115	324	88	55	142	101	351	602
2302.01 <u>2/</u>	: Corn and rice brans: max. 35 percent starch	81	267	233	279	222	265	190	80	11
2302.09	: Corn and rice brans: over 35 percent starch	-	-	5	5	6	7	4	3	3
2302.21 <u>3/</u>	: Wheat brans: max. 28 percent starch	1,073	1,237	1,707	1,704	1,733	1,679	1,001	887	665
2302.29	: Wheat brans: over 28 percent starch	-	-	5	6	2	7	1	3	4
2303.15 <u>4/</u>	: Corn gluten feed	598	930	2,596	2,837	2,842	3,566	3,734	3,542	4,098
2303.81 <u>5/</u>	: Sugar beet pulp	-	176	190	284	390	529	417	488	321
2303.90	: Brewers' and distillers' grains	453	57	290	365	377	498	416	436	633
2304.06	: Corn germ cake: less than 3 percent fat	-	465	856	790	735	735	609	530	571
2304.08	: Corn germ cake: 3-8 percent fat	-	60	202	242	328	570	427	428	869
2306.20	: Grape marc	-	10	38	57	35	42	38	8	0
2306.50 <u>6/</u>	: Citrus pulp	97	480	1,571	1,351	1,265	1,430	1,222	1,467	1,237
2306.90	: Other fruit waste	32	56	156	103	130	157	95	106	207
	: Total <u>7/</u>	3,698	6,075	13,039	14,788	16,221	14,132	13,612	14,665	15,043

- = Not available.

1/ NIMEXE codes 0706.10 and 0706.20 for 1983-86.2/ NIMEXE code 2302.11 for 1970 and 1975.3/ NIMEXE code 2302.13 for 1970 and 1975.4/ NIMEXE code 2303.10 for 1970.5/ NIMEXE codes 2303.51, 2303.53, and 2303.59 for 1986.6/ NIMEXE code 2306.10 for 1970.7/ EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (41).

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and less of their own grains and roughages as reflected in the steady expansion of the compound feed industry since the early 1970's. Compound feed production in the EC increased from 33.1 million tons in 1970 to 83.2 million tons in 1983 (table 20). Italy had the sharpest rise in compound feed production, with volume more than tripling in 1970-83. France and the Netherlands also displayed strong growth, with output doubling over the same period. West Germany and the Netherlands have the largest feed compounding industries followed closely by France.

Much of the growth in the compound feed market has been attributed to developments in the cattle sector. As EC dairy and beef production became more intensive in the 1970's, areas devoted to permanent pasture declined and the use of compound feeds expanded. Growth in cattle feed production is another development contributing to increased use of nongrain feed ingredients because a higher proportion of nongrain feeds can be used in ruminant rations than in rations for other livestock. The drought of 1975/76, which cut EC supplies of cereals and forage, caused a sharp jump in compound feed use in 1976. Compound feed production and use continued at a high level through 1983.

In 1984, EC compound feed production declined about 3 percent to 81 million tons due primarily to the imposition of milk production limits under the EC's quota system. Initially, dairy farmers responded to the milk quotas by adjusting to less intensive feeding regimes. The continued stagnation of EC compound feed production in 1985 is attributed to the more competitive position of cereal feeding as a result of lower cereal prices and a strong dollar. The EC compound feed industry in 1986 was characterized by increased competition and larger output despite a decline in cattle numbers. Factors responsible for the slight upturn in compound feed production (excluding the increase due to Spain and Portugal joining the EC) include a rise in pig feed demand and a fall in the value of the dollar, which has reduced the relative price of imported nongrain feeds and, therefore, lowered

Table 20--EC compound feed production

Country	: 1970	: 1975	: 1980	: 1981	: 1982	: 1983	: 1984	: 1985	: 1986
	<u>Million tons</u>								
West Germany	: 9.7	11.5	16.8	17.6	17.2	17.7	17.2	16.7	16.5
France	: 7.6	11.1	14.7	15.2	15.4	15.2	15.0	14.7	15.4
Italy	: 3.6	6.0	10.6	11.0	11.2	11.0	11.0	10.6	11.0
Netherlands	: 7.9	10.7	14.5	14.6	14.7	15.4	16.0	16.2	16.5
Belgium-Luxembourg	: 4.3	4.7	4.9	4.8	5.0	5.1	5.0	5.0	5.1
United Kingdom	: NA	10.2	11.1	11.0	11.8	12.2	10.7	10.5	11.2
Ireland	: NA	1.0	1.8	1.9	1.8	2.1	1.9	2.0	2.4
Denmark	: NA	2.9	4.8	4.8	4.6	4.5	4.2	4.3	4.5
Spain	: NA	NA	NA	NA	NA	NA	NA	NA	11.4
Portugal	: NA	NA	NA	NA	NA	NA	NA	NA	2.9
Total ^{1/}	: 33.1	58.1	79.2	80.9	81.7	83.2	81.0	80.0	96.9

NA = Not applicable.

^{1/} EC-6 for 1970, EC-9 for 1975 and 1980, EC-10 for 1981-85, and EC-12 for 1986.

Source: (21, 41).

the cost of compound feeds. The EC compound feed industry is facing a number of complex challenges as a result of recent CAP reform measures and other legislative proposals. The feed industry will see more competition and greater consolidation as it adjusts to these new challenges (21).

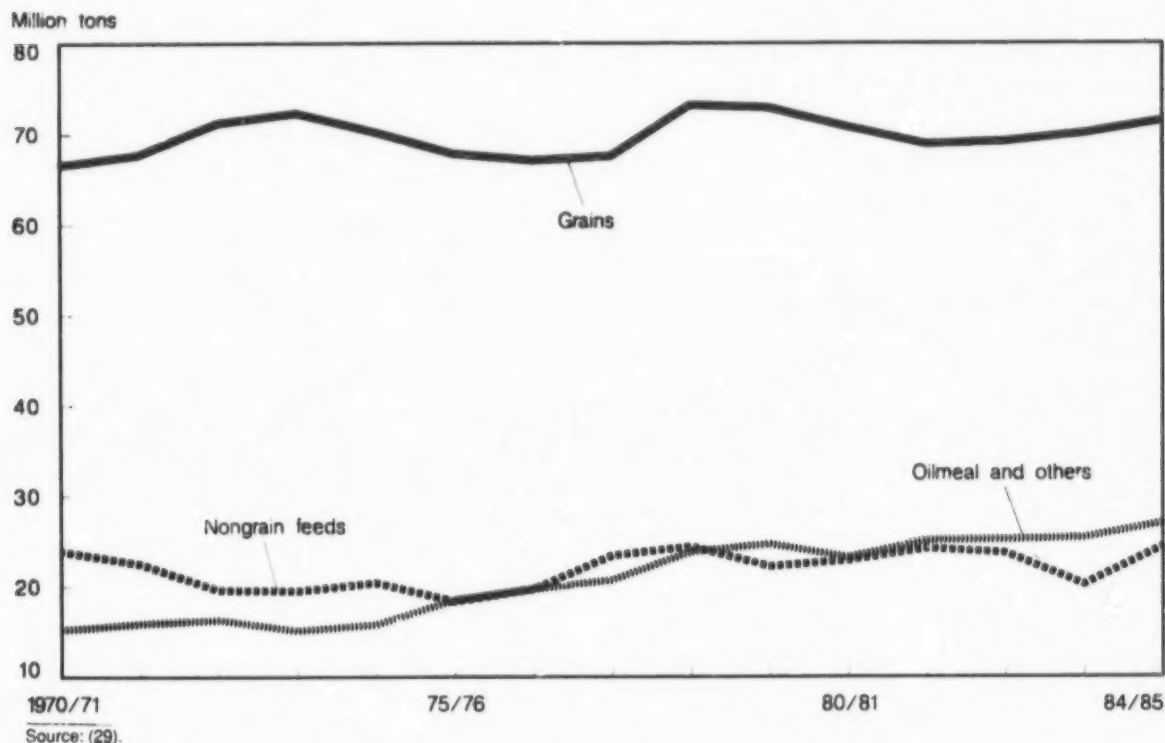
Feed Use Patterns

During the period of rising nongrain feed imports and compound feed production, the composition of EC feed consumption changed. Feed use of grains has followed a cyclical pattern, with peaks in 1973/74 and 1978/79 (fig. 1). Grain use in 1984/85 totaled 71.5 million tons, about 2 percent below the peak of 1978/79. Increased feed use of wheat and barley have been balanced by declining use of corn and other grains.

Use of protein meals and other high-protein feeds grew steadily from 15 million tons in 1970/71 to 27 million tons in 1984/85, a 4-percent annual growth rate. Expanded use of oilseed meals, especially soybean meal and rapeseed meal, offset the decline in fish meal use. The lack of progress in expanding oilseed production until the mid-1980's has kept the EC dependent on imports for much of its protein needs. Rapid growth in the EC's oilseed sector in 1985-87 has led to less dependence on imported oilseeds for protein meal supplies.

EC use of nongrain feeds has also followed a cyclical pattern, with peaks around 24 million tons in 1970/71, 1978/79, 1981/82, and 1984/85. Sharp declines in feed use of potatoes offset large increases in manioc and corn gluten feed consumption, while use of grain byproducts (brans, brewers' grains, and

Figure 1
EC feed use¹



distillers' grains) remained relatively steady during this period. The decline in potato use reflects a shift away from labor-intensive feed production and a switch to purchased feed concentrates.

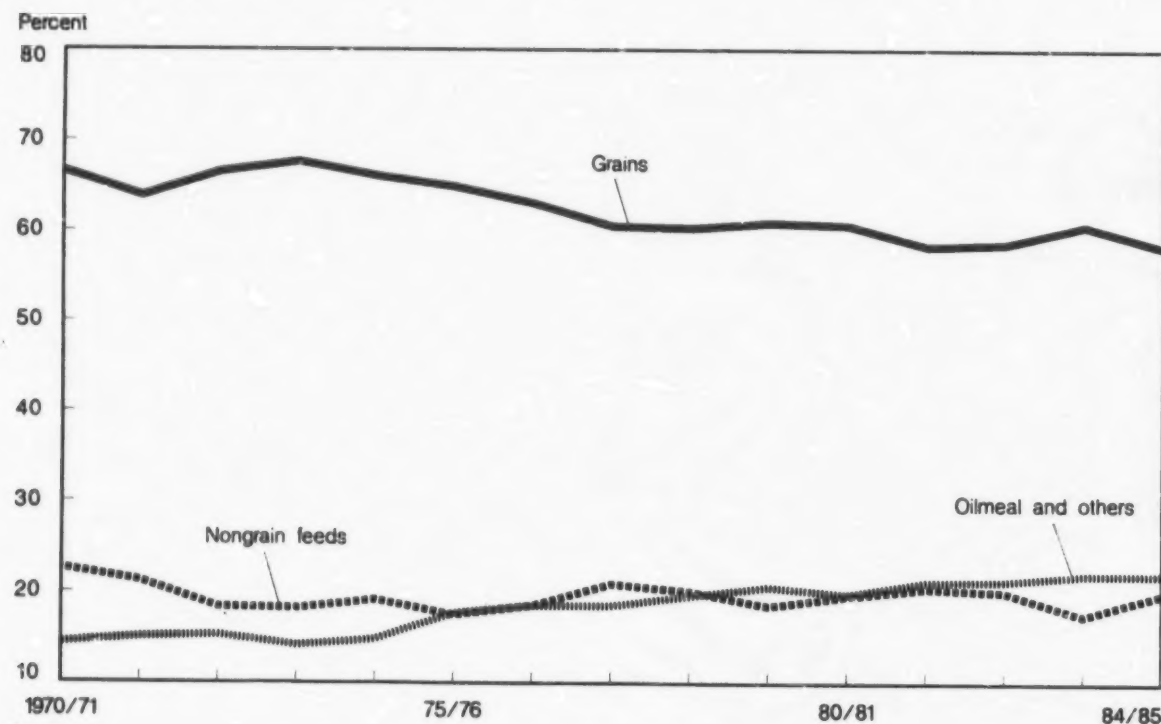
The most significant change in EC feed use patterns has been the rising share of protein meals and the declining shares of grain and nongrain feeds (fig. 2). EC feed use of grains rose from 63 percent in 1970/71 to a peak of nearly 68 percent in 1973/74, then fell to a low of around 58 percent in 1981/82 and 1984/85. The share of protein meal used as feed expanded from 14 percent in 1970/71 to 22 percent in both 1983/84 and 1984/85. The share of nongrain feeds declined from 23 percent in 1970/71 to a low of 18 percent in 1983/84 before recovering somewhat to 20 percent in 1984/85. Other nongrain feeds, excluding potatoes, increased from almost 11 percent of feed use in 1970/71 to 16 percent in 1984/85. These shifting feed patterns reflect technological progress in the feed-livestock sector, expansion in the compound feed industry, and price relationships among the various feeds.

The Influence of the Common Agricultural Policy

The Common Agricultural Policy (CAP) has widely influenced feed use patterns in the EC primarily through its effect on relative prices. The CAP uses three principal mechanisms to regulate commodity markets:

- o The purchase of commodities by intervention agencies to maintain support prices;

Figure 2
Share of EC feed use¹



Source: (29).

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- o Variable levies to prevent imports from selling at prices below those of domestic goods; and
- o Export subsidies (restitutions) to make EC commodities competitive in world markets.

Commodities covered by these support instruments include grains, dairy products, beef, and sugar. Other means of support are often used to supplement the three principal measures, including storage subsidies, consumer subsidies, voluntary restraint agreements with nonmember countries, and deficiency payments (5).

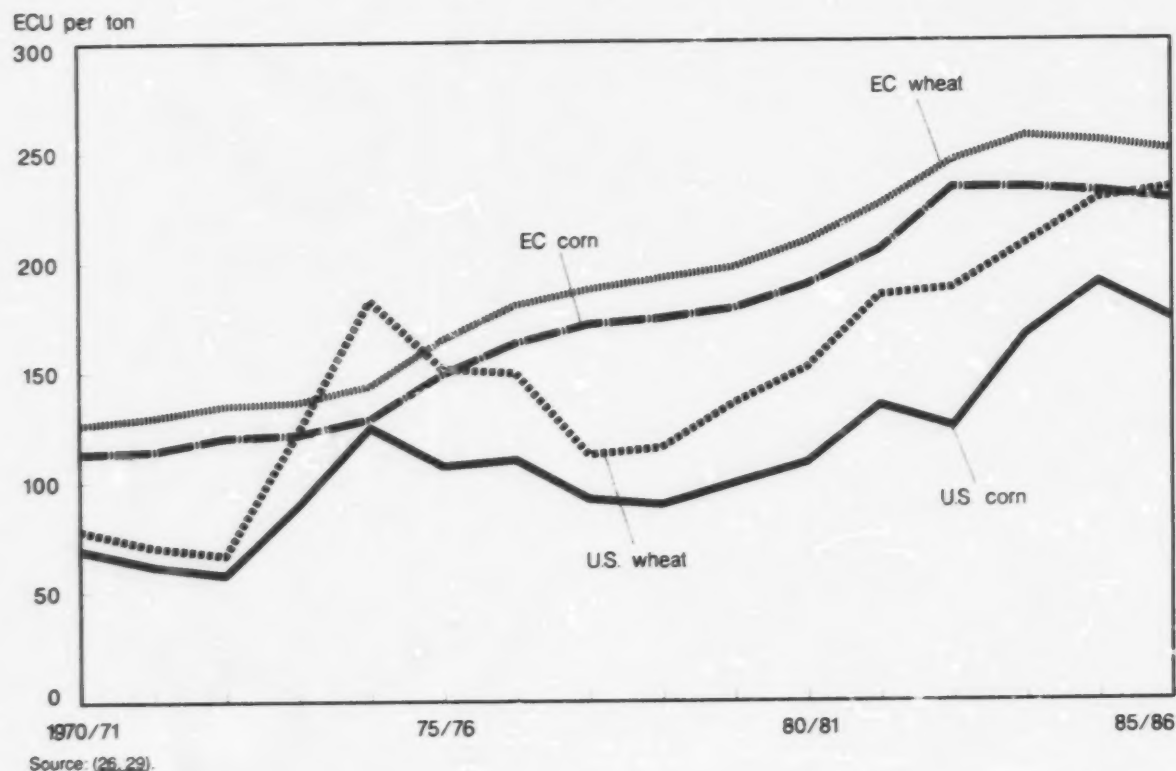
The CAP for grains has substantially increased EC grain prices above world prices in most years since 1970 (fig. 3). The threshold (minimum import) price for corn was 223 ECU per ton in 1982 compared with the c.i.f. price of 125 ECU per ton at Rotterdam for U.S. corn. The threshold price for wheat was nearly 246 ECU per ton compared with 188 ECU for imported U.S. wheat.

The degree of protection from imports that the CAP provides EC grains can be estimated by the difference between threshold and import prices, excluding the variable levy, expressed as a percentage of the import price:

$$DP = \frac{PT - PM}{PM},$$

where DP is the degree of protection, PT is the threshold price, and PM is the import price. This is a variation of a protection measure known as the nominal

Figure 3
EC threshold and import prices for grains



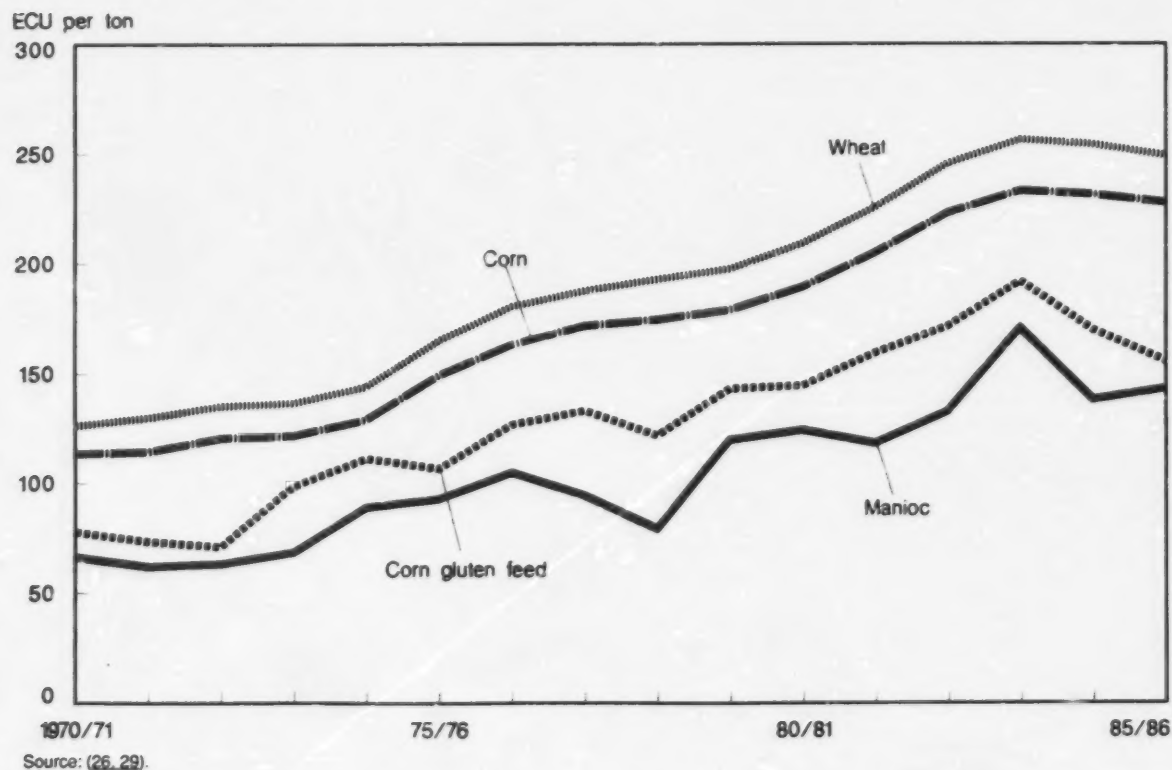
rate of protection (16) which uses the producer price in its calculation rather than the threshold price.

The degree of protection for wheat in 1970-85 ranged from a low of -21 percent in 1974 (that is, the threshold price was less than the import price) to a high of nearly 102 percent in 1972. The degree of protection for corn ranged from a high of nearly 108 percent in 1972 to a low of 3 percent in 1974. For 1970-85, the degree of protection averaged 29 percent for wheat and 55 percent for corn.

Unlike grains, most oilseed meals and nongrain feeds enter the EC free of duty or at relatively low tariffs because of the trade negotiations under the GATT in the early 1960's (app. table 2). The EC agreed to no or reduced tariffs for many of these feedstuffs during the Dillon Round of trade negotiations as compensation to the GATT contracting parties for acceptance of the CAP. The CAP, in turn, has kept EC grain prices above those of various imported feeds.

Import prices of manioc and corn gluten feed at Rotterdam have been substantially below EC threshold prices for corn and common wheat (fig. 4). In 1970-84, manioc prices averaged 45 percent below the EC threshold price of wheat and 39 percent below that of corn. Prices of corn gluten feed averaged 32 percent and 25 percent below the threshold prices for wheat and corn, respectively. These price differentials have prompted compound feed manufacturers to seek cheaper sources of feed ingredients. The rise in EC imports of nongrain feeds over the past 15 years demonstrates very well the profitability in using these products.

Figure 4
EC grain and feed prices



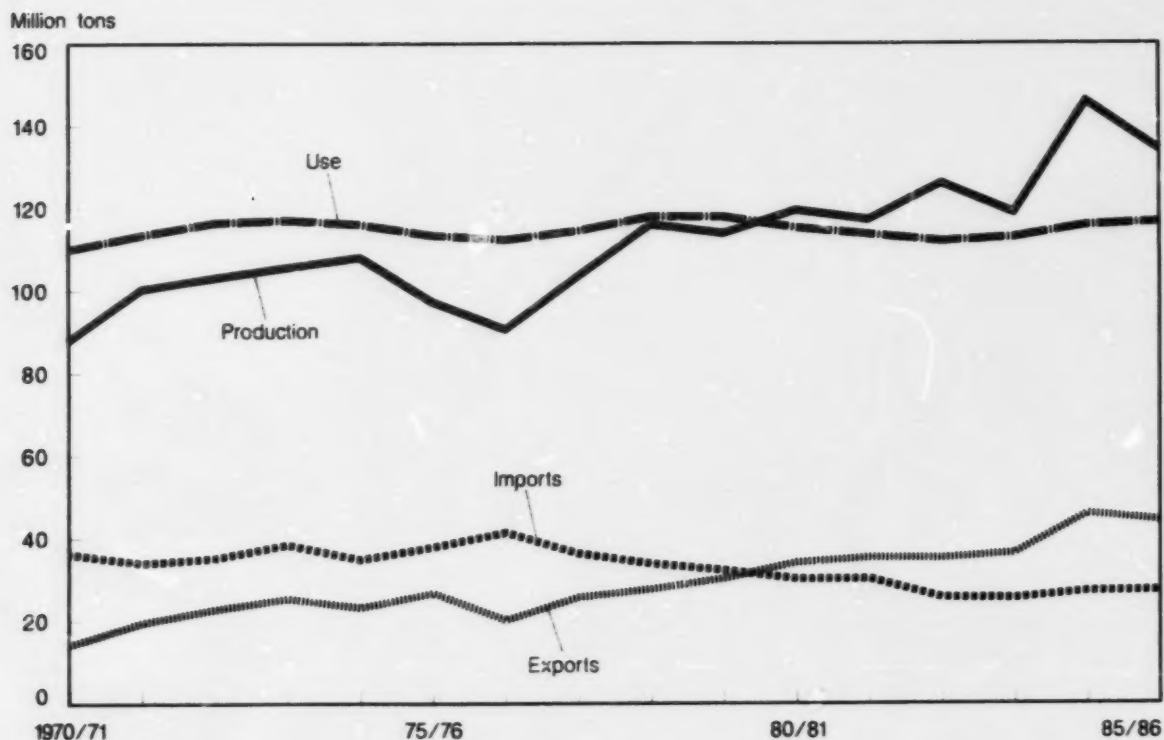
BUILDUP OF COMMODITY SURPLUSES

The price support and variable levy mechanisms of the CAP, combined with support policies of individual member countries, have provided strong incentives for investing in EC agriculture. The transfer of resources to the agricultural sector has resulted in structural adjustments, adoption of new technologies, and significant productivity improvements.

Agricultural production in the EC grew steadily from the late 1960's to the early 1980's at an average annual rate of nearly 2 percent. However, domestic consumption of agricultural products grew only at around 0.5 percent per year. The slower growth in consumption is attributed to low population growth rates, a decline in income growth, high existing levels of food consumption, competition from substitutes, and changing diets (5). The disparity in growth rates between production and consumption has generated exportable surpluses for a number of agricultural commodities, especially grains, dairy products, beef, and sugar. In fact, this development has changed the EC from one of the world's largest agricultural importers to one of the leading exporters.

Grain is the keystone to EC agriculture because of its widespread production and use and its relationship with other agricultural products, notably livestock products. EC grain production rose from 91.4 million tons in 1970/71 to a record 151.6 million tons in 1984/85, an annual rate of around 3.7 percent (fig. 5). Increased yield accounted for most of the rise due to attractive grain support prices, adoption of high-yielding varieties, more intensive fertilization, increased mechanization, and improved management practices.

Figure 5
EC supply and use of grains



Source: (26).

While grain production was expanding, grain consumption remained fairly stagnant, fluctuating in the range of 114-122 million tons. Human grain consumption has been static, reflecting low population growth in the EC and the low response of consumption to income changes. Despite a sharp rise in the production of livestock products, feed use of grains has also remained relatively static. This development is the result of a combination of high EC grain prices, increased use of oilseed meals and certain nongrain feeds, and improvements in animal productivity.

The imbalance between supply and demand for grains has consequently moved the EC from a net importer to a net exporter. In 1970/71, EC net grain imports reached 20 million tons--6.1 million tons of wheat and 13.9 million tons of coarse grains. In 1980/81, the EC became a net grain exporter with volume at 4.3 million tons. By 1984/85, EC net grain exports reached 19.3 million tons--15.3 million tons of wheat and 4 million tons of coarse grains. Thus, the shift from a grain trade deficit of 20 million tons to a trade surplus of 19.3 million tons far offset the 11-million-ton increase in nongrain imports during this period. The EC ranks third among world wheat exporters, surpassing Australia since 1980/81.

EC grain production in 1986/87 fell about 10 percent from the record of 1984/85 because of declines in both area and yield. Net exports are estimated to remain around 19 million tons as pressure to export continues because of record stock levels.

Dairy farming has a long history of surpluses. A combination of factors spurred growth in EC milk production (2.1 percent per year since 1970):

- o Support policies (intervention buying, storage aids, export subsidies),
- o Favorable milk-to-feed price ratios,
- o Better management practices,
- o Closer links with beef production,
- o Genetic improvements in dairy cattle, and
- o Greater use of nutritionally balanced feeds.

With the number of dairy cows remaining at around 25 million since 1970, the increase in milk output is tied to the rise in average milk yield per dairy cow. Average yield per cow was 4,440 kilograms in 1985 compared with 3,145 kilograms in 1970.

EC consumption of milk and dairy products (whole milk-equivalent) grew 0.5 percent per year in 1973-84 due to low population and income growth, high consumption levels, changes in taste, and competition from substitutes (for example, vegetable oils for butter). This overall trend, however, conceals diverse consumption patterns of individual products. Consumption has been rising for cheese, falling for butter, almost constant for fresh milk, and fluctuating for nonfat dried milk.

Uneven growth in EC dairy production and consumption and preferential treatment for imports of New Zealand butter and cheese have led to a continual buildup of dairy surpluses. With the aid of export restitutions, the EC has emerged as the

world's largest exporter, accounting for 40-50 percent of world trade in recent years. World market conditions and budgetary considerations periodically limit the export market as an outlet for EC dairy surpluses. This situation has led to large inventories of dairy products (especially butter and nonfat dried milk), making the EC the largest stockholder of dairy products in most years since the early 1970's.

Since the early 1970's, the EC has generated exportable surpluses of a number of other agricultural products, including beef, pork, poultry, sugar, and certain fruits and vegetables. With the aid of domestic support policies, export subsidies, and aggressive promotion programs, the EC has become the world's largest exporter of pork, poultry meat, eggs, beef, and veal. The EC's share of world exports of livestock products in 1985 was butter (40 percent), beef and veal (21.5 percent), cheese (46.4 percent), pork (23.6 percent), nonfat dried milk (26.4 percent), poultry meat (29.3 percent), and eggs (27.1 percent) (8).

THE EC BUDGET CRISIS

EC agriculture receives about 25 percent of its support from the EC budget. The remainder comes from consumers (in the form of high commodity prices) and from national governments. Budget expenditures for agriculture include export refunds, storage payments, marketing aids, processing aids, monetary compensatory amounts, and other forms of assistance. The Treaty of Rome requires most of these expenditures for implementing the CAP. Agricultural expenditures have ranged between 60 and 80 percent of the total EC budget since the mid-1970's. The remainder of the budget is devoted to various regional and social programs and research in the nonagricultural sector.

Among agricultural programs, dairy support operations are the most expensive, with more than 30 percent of total support expenditures in recent years. Support of beef and veal markets represent the second largest spending category, followed closely by support for cereals.

The EC finances its budget expenditures from four principal sources:

- o A fixed percentage of the value-added tax (VAT) (see Glossary),
- o Customs duties on industrial goods,
- o Import levies on agricultural imports, and
- o Levies on domestic production of certain commodities.

Most of the EC's budget revenue comes from the VAT, followed by customs duties and levies. In recent years, special borrowing arrangements have been needed to supplement the traditional sources of revenue.

The EC faced a financial crisis in 1983 when planned expenditures exceeded revenues due to a sharp rise in program costs. The continued buildup of surplus commodities increased expenditures for storage aids and export refunds, while the economic recession in Europe raised the cost of social programs. EC expenditures reached 24.9 billion ECU in 1983, up nearly 25 percent from the previous year. Agricultural expenditures amounted to 16.6 billion ECU (67 percent of the total), while nonagricultural outlays reached 8.4 billion ECU (33

percent of the total). EC revenues, however, totaled less than 24.8 billion ECU, resulting in a deficit of over 100 million ECU.

To stem the budget crisis, the EC Commission made special provisions to use surplus funds from the previous year's operations, defer payment for some programs to the following year, and limit certain expenditures. These special arrangements were invoked again in 1984 and 1985 as the budget crisis continued (5,8).

The 1986 budget was 34.7 billion ECU, of which 22.9 billion ECU was allocated for agricultural support spending. To cope with the projected budgetary shortfall, the Commission trimmed back spending wherever possible by cancelling expenditures that were not needed in 1986, deferring some expenditures until 1987, and raising VAT contributions of member countries from 1 percent to 1.4 percent. A combination of lower revenues from import levies (due to the fall in the value of the U.S. dollar) and rising costs of export subsidies would have pushed CAP spending through the allocated resource ceiling. 6/

Mid-1987 estimates put the 1987 budget shortfall at 5 billion ECU and the projected 1988 revenues of 35.5 billion ECU at about 6.5 billion ECU less than anticipated spending obligations. Attempts to win acceptance of a new financing formula failed at a June 1987 summit meeting of the 12 heads of government, mainly because of Britain's opposition. A stopgap emergency financing plan was adopted to get the EC through 1987. Measures include:

- o Converting payments to member countries from a system of advances to a system of reimbursements,
- o Using the remaining resources (640 million ECU) from the VAT for 1987, and
- o Dropping the 10-percent refund to member countries for the cost of collecting financial resources (customs duties, agricultural levies, and sugar levies).

These measures are expected to produce an additional 3 billion ECU, leaving a 2-billion-ECU shortfall for 1987. Since the heads of government did not agree to a proposal that each member country make an extrabudgetary contribution to cover the gap, the EC Commission will have to make spending cuts to stay within budget resources (1, June 26 and July 3, 1987).

In regard to future financing of the EC budget, the Commission has suggested a system based on a percentage of each country's GNP instead of the current VAT-based system. The other alternative is an increase in the present VAT ceiling of 1.4 percent to 1.6 percent as suggested in the 1984 Fontainebleau agreement.

THE CEREAL SUBSTITUTE PROBLEM

Even before the budget crisis of 1983, various groups in the EC were blaming cereal substitutes for some of the EC's fiscal problems. In response to

6/ According to EC Commission and independent analysts, a 10-percent fall in the value of the dollar is likely to cost between 800 million ECU to over 1 billion ECU in larger export subsidies to fill the widening gap between EC support prices and falling world market prices for the EC's agricultural exports (1, Mar. 7, 1986).

written Parliamentary questions concerning imports of certain nongrain feeds, the EC Commission stated that imports of cereal substitutes represented a twofold problem for the budget: the loss of revenue from import levies due to lower corn imports and an increase in refunds to export surplus barley. The Commission figured that cereal substitutes in the 1979/80 marketing year displaced 8.9 million tons of feed grains. It considered manioc "a destabilizing factor on the EC cereals market" and called for deconsolidation of manioc under the GATT to harmonize the EC's policy on cereal substitutes. However, the Commission did note that other nongrain feed imports had not reduced the use of EC grains in absolute terms and, in fact, had kept prices of pork and poultry down (1, Jan. 1981).

The "problem of cereal substitutes" was the subject of a special article in the EC Commission's 1980 annual report on the Agricultural Situation in the Community (8). The Commission noted that the CAP's system of price supports and import levies for cereals and livestock products while various feeds are permitted duty-free access has led to a disequilibrium in EC agriculture. The subsequent increase in the use of feed supplements and more intensive livestock systems has led to a sharp rise in the production of livestock products and larger budget outlays for surplus disposal.

The high cost of EC dairy policies in the form of higher prices and taxes for domestic consumers and lower prices and smaller market shares for competing exporters has given way to strong pressure from both inside and outside the EC for policy reform. Some EC officials point to the sharp increase in the use of soybean meal and nongrain feeds in dairy rations as the reason behind high milk yields and corresponding surpluses (1, May 18, 1984). Others, particularly those in the compound feed and livestock industries, hold a contrary view of the role of imported feedstuffs. They see the relatively cheap imported feeds as benefiting livestock farming and processing industries with higher employment and benefiting consumers with cheaper livestock products.

PROPOSALS TO DEAL WITH COMMODITY SURPLUSES AND THE BUDGET DEFICIT

To try to deal with imbalances in the EC's cereals and dairy markets and the CAP's financial crisis, the EC Commission has proposed several courses of action:

- o Adjust cereal price supports to improve their competitiveness with nongrain feeds,
- o Extend the system of guarantee thresholds and coresponsibility levies to all sectors with chronic surpluses,
- o Tax the consumption of vegetable and marine fats and oils,
- o Negotiate voluntary restraint agreements with the suppliers of certain imported feeds, and
- o Impose import duties or levies on selected nongrain feeds.

Manipulation of Cereal Prices

The EC Commission has been searching for a means to reduce production and increase cereal consumption. Manipulation of cereal prices is seen as one of

the principal means of influencing EC production and consumption decisions. Cereal prices may be directly manipulated by using the following methods:

- o Gradually lowering EC cereal prices to world price levels,
- o Freezing prices at current levels, and
- o Increasing cereal prices less than prices for other products.

Methods for restraining EC cereal prices to reduce surplus production and large budget expenditures have been proposed for some time. Michael Johnston of the Grain and Animal Feed Trade suggested a reduction in real EC price supports as one of five possible courses of action to deal with the budget problem (1, Oct. 2, 1981). The agricultural ministers of the United Kingdom and Italy proposed to the EC Council of Ministers that cereal prices be lowered to make them more competitive with imported feed prices (1, July 24, 1981). Toepfer International, the grain and feed traders' association based in Hamburg, West Germany, made a similar recommendation in response to the Commission's proposal to restrict imported nongrain feeds (1, Feb. 5, 1982; 46). In a detailed study of imported feeds, the European Feed Manufacturers' Federation (FEFAC) suggested limiting cereal price increases and aligning EC prices with world market prices to alleviate EC grain surpluses (20).

In October 1981, the EC Commission expressed the need for a general policy on cereals to narrow the gap between EC prices and the prices of competing countries (10). The Commission recommended the gradual reduction of real EC cereal prices to "neutralize the advantage presently enjoyed by cereal substitutes." The Commission also suggested that the EC open discussions with major suppliers of cereal substitutes to the EC to limit sales to current levels during the period of price alignment. The Commission's aim was to gradually narrow the gap between cereal prices in the EC and the United States through 1988.

As a first step toward the goal of price reform in the cereals sector, the EC Council of Ministers approved a smaller price increase for cereals in 1982/83 than for other crop products. The EC Commission also introduced legislation that same year to restrain cereal prices through the guarantee threshold system (8, 1982, 1983).

Guarantee Thresholds and Coresponsibility Levies

The principal of guarantee thresholds is to make producers share part or all of the cost of disposing of production beyond a certain level. The additional cost to producers might take the form of either reduced support prices or the payment of a tax. Guarantee thresholds have been fixed for cereals, rapeseed, sunflowerseed, milk, cotton, sugar, tomato products, and raisins.

In an attempt to constrain budget expenditures in the cereals sector, the EC Commission introduced a regulation (No. 2727/755) in 1982 to establish a guarantee threshold system that links support prices to EC cereal production (1, Sept. 2, 1985). Each year, the Council of Agricultural Ministers sets the guarantee threshold for cereals production (except that for durum wheat and rice) and support prices. If average production in the 3 previous marketing years exceeds the threshold, then intervention and reference prices for the coming year are reduced by 1 percent for each 1 million tons exceeding the threshold level up to a maximum of 5 percent. However, the guarantee threshold

is adjusted to the import level of cereal substitutes. 7/ If imports of these products exceed 15 million tons in the previous marketing year, the guarantee threshold for cereals in the current marketing year is increased by the excess amount. In 1984/85, the guarantee threshold for cereals was set at 121.32 million tons. The Commission combined the guarantee threshold for cereals with that for durum wheat for the 1985/86 marketing year, yielding a total threshold of 126 million tons (1, Sept. 2, 1985).

Despite exceptionally wet weather in northern Europe and drought in parts of southern Europe, the EC harvested a 141-million-ton cereals crop in 1985/86, the second largest crop on record. The ineffectiveness of the guarantee threshold program in curbing cereal production and related budget expenditures led to its abandonment in 1986 in favor of a producer coresponsibility levy. The levy, in the form of a volume-related tax on production, became part of the EC's 1986/87 cereals price package. The levy was initially set at a rate of 5.38 ECU per ton, applying to all grain irrespective of type and quality. In establishing the amount of the levy, various factors were taken into account: the size of the crop, domestic consumption, exports, imports of substitutes, and the costs of subsidizing exports and starch production. The levy is to be maintained for 5 marketing years (1986/87-1990/91) with the rate determined annually by the Council of Ministers.

The principal feature of the levy is that it must be paid by cereal producers who market their crop or sell to intervention (storage agency). Cereals consumed on the farm are not subject to the levy nor are farmers who market less than 25 tons of grain. The levy system makes farmers pay directly and immediately for excess production and should instill a greater market orientation among farmers than the guarantee threshold program.

Milk Production Quotas

Following years of imbalances in the dairy sector, the Commission introduced a system of quotas on EC milk production in April 1984 to try to inhibit further growth in dairy surpluses. The quotas operate in conjunction with a coresponsibility levy (super-levy) imposed on producers who exceed the quotas. The milk quota system consists of a guaranteed quantity, a direct sales quota, and a reserve. The guaranteed quantity in the 1984/85 marketing year was 99.02 million tons, the reserve was 335,000 tons, and the sales quota was 4.26 million tons. The guaranteed quantity is allocated among EC-member countries, except Italy and Ireland, based on their 1981 milk deliveries plus 1 percent. For Italy and Ireland, the guaranteed quantity is equal to their 1983 milk deliveries. The purpose of the reserve is to allocate small additional quantities to countries where dairying is particularly important.

The sales quota is the quantity of milk or milk-equivalent of dairy products that can be sold directly from farms. It is set just below the estimated sales volume for 1982. The total production quota, excluding the reserve, was 103.3 million tons for 1984/85 and is 102.4 million tons for marketing years 1985/86 to 1988/89. Milk deliveries exceeding the quotas are subject to a levy of either 75 percent or 100 percent of the target price for milk, depending on whether the member country has opted for quota management at the farm or dairy level (13).

7/ The EC Commission lists as cereal substitutes the items in table 1.

The system of milk quotas and levies halted the increase in milk output during the first 2 years of operation, with production declining 2.4 percent in 1984 and 1.7 percent in 1985. The reduction was due mainly to extensive culling of the least productive dairy cows. Milk production edged up slightly in 1986 to 107.8 million tons as producers exceeded their deliveries. To trim production further, the EC set delivery quotas to drop an additional 2 percent in 1987/88 and 1 percent in 1988/89. Yet, the Commission estimates that milk yield per cow is expected to grow at an annual rate of 1.5 percent through 1992. Hence, milk production will remain stable, despite further reductions in dairy herds (19). Buying the resulting products, butter and skim milk powder, at intervention prices would continue to place a large burden on the agricultural budget.

Tax on Vegetable and Marine Fats and Oils

In January 1987, the EC Commission proposed a tax on vegetable and marine fats and oils as part of its 1987 farm price package. The question of a fats and oils tax is a longstanding issue and is currently linked with the EC plan to reform the CAP and reduce the budget deficit. The initial tax level would be set at a maximum of 330 ECU per ton for the period July 1, 1987, to December 31, 1988, and would be levied on fats and oils for human consumption when the product leaves the refinery or is imported. The tax is based on the average ex-refinery price of soybean oil in the EC. Each year, the previous year's average price is compared with a reference level which is the average price over the past 5 years. The tax is calculated as the amount the reference level exceeds the previous year's price. Based on an EC-10 oil production figure of 6.1 million tons, the proposed tax is expected to yield 2.01 billion ECU. Spain and Portugal would be exempt from the tax until 1991 (1, Feb. 6, 1987).

The tax is described by EC officials as an "oilseed stabilization scheme," designed to raise revenue for supporting the rising cost of the EC's oilseed regime. Oilseed producers in the EC are supported by a comprehensive system of deficiency payments to maintain farm prices. This price support system has led to the most dramatic increase in production and costs of any sector in the history of the CAP (1, Feb. 13, 1987). EC estimates put the cost of the oilseed regime at 4 billion ECU for 1987 with the prospect of reaching 6 billion ECU by 1990 when Spain and Portugal fully adapt to the EC system. Guarantee thresholds for oilseed production and limits on intervention have also been proposed as part of the oilseed reform package.

The tax is expected to raise the price of cheaper imported oils relative to more expensive domestic oils (especially olive oil) and make margarine less competitive with butter. The burden of the tax is expected to fall on EC consumers and third countries that have supplied the bulk of the EC's fats and oils in the past. Overall consumption of vegetable oils in the EC would decline as would exports from non-EC countries, particularly the United States, Malaysia, the Philippines, Brazil, and Argentina.

Oilseed-producing countries strongly opposed the proposed tax at the February 1987 meeting of the Intergovernmental Group on Oilseeds of the Food and Agricultural Organization of the United Nations (FAO). The United States views the tax as a violation of the EC's obligations under the GATT and strongly protested against the measure. The group of 26 African, Caribbean, and Pacific (ACP) nations, which export to the EC under the terms of the Lome Convention, also urged the EC Commission to withdraw the proposed tax. Within the EC, member countries have been divided over the tax issue. Some northern EC member countries oppose the tax increase because of large investments in oilseed

crushing facilities. Other countries, accounting for most of the recent increase in rapeseed, sunflowerseed, and soybean production, support the tax measure because of the additional revenues available for funding the oilseed regime. Paradoxically, Mediterranean countries, producing the bulk of the olive oil, oppose the tax because of the cost to consumers. The European Consumers Organization (BEUC) similarly opposes the proposed tax.

After nearly 5 months of debate, the EC Council of Agricultural Ministers approved the 1987 price package in June 1987 but without the proposed consumption tax on fats and oils. Because of the compromises that were required to obtain approval of the price package, the 1987 agriculture budget was expected to be 4 billion ECU in deficit. The Commission blamed a large part of the budget shortfall on the failure of member countries to approve the tax on fats and oils and pledged that the tax issue would be raised again.

Voluntary Restraint Agreements

Between 1980 and 1983, the EC Commission tried to negotiate a series of voluntary restraint agreements with Thailand to limit Thai shipments of manioc to the EC. The agreements remained unsigned because Thailand was concerned that the EC's lack of restraint agreements with other manioc suppliers would undermine its position in the EC's manioc market. Thailand's interpretation of this provision involved the "establishment of a global tariff quota system for third countries other than Thailand." Because the 6-percent duty on manioc is bound by the GATT, the EC Commission must negotiate the unbinding of the duty to allow control of imports of other manioc suppliers who are GATT members. Brazil and Indonesia are GATT members, but Thailand and China were not at the time of the negotiations.

In April 1983, the EC and Thailand signed a formal agreement to control manioc trade. Under the agreement, Thai exports to the EC were limited to 5 million tons in each of 1983 and 1984, declining to 4.5 million tons annually in 1985 and 1986. The agreement permitted Thailand to exceed the annual quota by 10 percent over a 2-year period, that is, 450,000 tons for 1985-86. Because Thailand's shipments to the EC in 1985 exceeded the quota and the additional 10-percent allotment, shipments in 1986 were limited to 4.5 million tons.

For other manioc suppliers, quotas were fixed at 882,355 tons for GATT countries (750,000 tons for Indonesia and 132,355 tons for Brazil) and 370,000 tons for China in 1983 and 1984. China had originally asked for an 850,000-ton quota in 1983 compared with its 372,000-ton quota in 1982. Because of below-quota deliveries, the Chinese quota was reduced to 300,000 tons in 1985 and kept at that level in 1986. The GATT quota was increased to 970,590 tons for 1985 and 1986, with 85 percent of this amount reserved for Indonesia. The EC charges a maximum ad valorem duty of 6 percent of the cost, insurance, and freight (c.i.f.) price on imports within the quota. Imports exceeding these levels are subject to the variable levy on barley (1, 1986).

Thailand has sought more liberal arrangements for manioc exports to the EC than the amounts laid down in recent agreements. The Thais have asked the EC to end the quota system in return for an EC import tariff higher than the present 6 percent. This proposal is opposed by EC traders who fear that lifting the 6-percent ceiling would create greater uncertainty about prices and volume of manioc imports.

Manioc exports have become very important to the overall Thai economy. Manioc has become Thailand's second largest agricultural export after rice, providing a livelihood for well over 5 million people, mostly in poverty-stricken areas. Under the original cooperation agreement with Thailand, the EC pledged financial assistance for crop diversification programs in return for limits on exports. The EC wants to help Thai manioc producers move into other crops, such as rubber, kenaf, cotton, and cashews. Thailand claims, however, that so far, the EC has allocated only a small portion of its \$35-million pledge. In the meantime, manioc production continues to expand, largely because it can be profitably grown on rather poor soils in northeastern Thailand where rainfall is highly variable.

Thailand and the EC signed a new manioc agreement on May 23, 1986, in Brussels to continue the cooperation agreement of April 1983. The new agreement set the manioc import quota at 21 million tons for the 1987-90 period compared with 18.9 million tons imported during the previous 4-year period. However, Thai exports to the EC will be restricted to a maximum of 5.25 million tons in any one year. Annual quotas for other major suppliers are Indonesia (825,000 tons), Brazil (145,590 tons), and China (200,000 tons). A maximum import levy of 6 percent will continue to be applied to these manioc quotas, including hard pellets.

In November 1986, the EC Commission proposed to raise the annual manioc quota to 350,000 tons for China, and to 30,000 tons for other non-GATT countries, like Vietnam, to foster better trade relationships. The proposals also called for a duty-free quota of 600,000 tons for sweetpotatoes during 1987-89. The EC had invoked the GATT's safeguard clause and suspended imports of sweetpotatoes in April 1986 due to the sharp increase in supplies from third countries (1, Nov. 28, 1986).

Import Restrictions on Nongrain Feeds

One of the most contentious EC policy reform measures during the 1980's has been proposals to restrict nongrain feed imports to deal with commodity surpluses and budgetary problems. The EC debated a variety of proposals concerning imported nongrain feeds in 1981: voluntary restraint agreements on manioc, higher levies on brans and sharps, and limits on corn gluten feed. However, no new restrictions were imposed that year due to internal differences over the issue between cereal producers (primarily France) and large consumers of nongrain feeds (the Netherlands, West Germany, and the United Kingdom). The United States and other exporters of nongrain feeds also expressed their concerns over the restrictive proposals.

On April 7, 1982, the EC Commission announced its proposals to limit imports of selected nongrain feeds. The EC Commission sought authority from the EC Council of Agricultural Ministers to negotiate with the United States for a duty-free quota of 3 million tons on corn gluten feed. Imports over the quota amount would be subject to a levy. The EC would have to renegotiate the GATT binding, which calls for duty-free access on corn gluten feed. The U.S. Congress voted unanimously for a resolution calling on President Reagan to tell the EC Council of Agricultural Ministers that any trade restrictions on corn gluten feed would seriously affect trade relations between the EC and the United States. The EC's "113 Committee," an intergovernmental committee on trade, turned down the Commission's request to renegotiate the bindings on corn gluten feed (1, 1982).

In August 1982, the EC implemented an import licensing system for corn gluten feed, distillers' grains, citrus pulp, and sweetpotatoes. The aim of the system is to incorporate these products into the common organization of the grain market and provide a statistical check on imported quantities of corn gluten feed and other feed materials. The Commission claimed that statistics from national governments were inadequate. The move was seen by some as a first step toward limiting imports of corn gluten and other feed materials. But, so far, the licensing system has been nonrestrictive in that licenses have been freely granted.

The EC increased its import levies on brans in 1982 to further curb imports of this nongrain feed. The Commission believed that by importing wheat byproducts, the EC was indirectly assisting its competitors' flour milling industries as well as EC millers who were using the inward processing system. ^{8/} The EC phased in the levy over a 4-year period, charging a levy equal to 0.12 times the full cereal levy in 1982/83, 0.14 in 1983/84, 0.16 in 1984/85, and 0.20 in 1985/86.

Limitation on imports of certain nongrain feeds used for animal feed was part of the Commission's CAP reform proposal released in July 1983. The Commission claimed that imported nongrain feed ingredients reduced the grain portion in compound animal feed, causing greater expenditure on intervention buying of EC cereals that the market cannot absorb. The Commission also blamed imports of soybeans and soybean meal for undermining the EC cereal market and for contributing to the expansion of dairy production. In the Commission's view, feed compounders were using soybean meal and nongrain feeds not merely as a cheap protein ingredient but as a replacement for EC-produced cereals.

Import limitations on certain nongrain feeds were also regarded as counterparts to proposed CAP reforms, particularly the following:

- o Narrowing the gap between EC prices and those received by farmers in the main exporting countries; and
- o Effectively applying the guarantee threshold system for cereals.

The Commission believed that limiting the availability of cheap nongrain feed ingredients to EC livestock producers would result in increased use of EC cereals, alleviating the budgetary burden of cereal market support.

The United States and the EC held technical consultations to discuss EC proposals to restrict nongrain feeds in November 1983. The United States presented evidence that corn gluten feed had not displaced EC grain in feed rations, rather, high EC grain prices were to blame. The United States suggested that the EC lower its grain prices as a solution to its surplus problem in the grain sector rather than shifting the burden of adjustment to third countries.

In January 1984, the Commission issued a proposal to limit imports of corn gluten feed, brewers' byproducts, and corn germ cake to specified duty-free levels, above which they would be subject to variable levies (table 21). The import ceiling on corn gluten feed would be set at 3 million tons, representing

^{8/} The EC Commission exempts the payment of import levies on imported grains for processing and subsequent export.

average EC imports over the 1980/81-1982/83 marketing years, but about 10 percent below the 1982/83 level.

The fear that U.S. exporters would circumvent the expected duty on corn gluten feed by increasing shipments of other corn milling byproducts reportedly prompted the inclusion of brewers' byproducts and corn germ cake in the quota. Duty-free imports of brewers' byproducts would be limited to 400,000 tons. Corn germ cake would be limited to 1.1 million tons: cake with a fat content of up to 3 percent (750,000 tons) and cake with a fat content of above 3 percent (350,000 tons). These import ceilings correspond with average EC imports over the 1980/81-1982/83 marketing year.

Citrus pellet imports, primarily from Brazil and the United States, were omitted from the original Commission proposal. The Commission did not think these imports were likely to increase very much and, therefore, would not pose a threat to cereal use.

The U.S. Government objected strongly to the EC's proposed import restrictions and planned to introduce countermeasures. Restrictions on French and Italian wines and French dairy products were mentioned as possibilities (1, June 8, 1984). In October 1984, the EC offered to increase its planned duty-free quota of 3 million tons for corn gluten feed imports to 3.4 million tons. EC officials indicated that the proposed duty-free quota coincided with the nearly 3.4 million tons of U.S. corn gluten feed sent to the EC in 1982/83. However, the U.S. remained firm in its opposition and urged the EC not to implement the restrictions. The proposed restrictions were not implemented due to mixed support within the EC and strong opposition from exporters of corn byproduct feeds.

The debate over imported nongrain feeds subsided throughout 1985 as EC demand for these feeds stabilized. However, calls for import restrictions on corn gluten feed re-emerged in 1986 over a dispute with the United States concerning the loss of U.S. grain sales to Spain and Portugal following their accession to the EC. The United States claimed losses of grain sales totaling \$400 million and threatened import duties on a wide range of food products from the EC unless compensation was provided. The EC countered these threats with proposals to impose import duties on corn gluten feed, soybean meal, and a variety of other exports from the United States. The United States and the EC negotiated for the

Table 21--EC Commission's proposed limits on nongrain feed imports

Feed	: 1982/83 : : imports :	Proposed : : quota :	: Difference :	: 1982/83 Dutch : : consumption :
			<u>1,000 tons</u>	
Corn gluten feed	: 3,350	3,000	350	1,631
Brewers' byproducts	: 475	400	75	340
Corn germ meal	: 1,260	1,150	110	409

Source: (1, Mar. 23, 1984).

rest of the year to diffuse the trade conflict, and on January 29, 1987, reached an accord over compensation for the loss of U.S. export sales. Under the agreement, negotiated under Article 24/6 of the GATT, Spain is required to import 2 million tons of corn and 300,000 tons of sorghum annually through 1990 from non-EC countries. The import levels are to be adjusted downward by any increase in Spain's imports of selected nongrain feeds--corn gluten feed, distillers' grains, and citrus pulp.

The issue of import restrictions on nongrain feeds was again rekindled in October 1987 when the EC Commission laid its negotiating mandate for the Uruguay GATT round (1, Oct. 9, 1987). One of the EC's positions is that it should be allowed to trade reductions in cereal levies and export restitutions for increased restrictions on imports of nongrain feeds. The United States strongly opposed the EC's proposal and stressed the importance of maintaining continued access to the EC market for nongrain feeds. The debate over nongrain feed imports is likely to remain a thorny issue throughout the current GATT round.

IMPORT RESTRICTIONS AND THE GATT

Nongrain feeds can be divided into two groups according to the EC's obligations under the GATT. One group consists of products for which the EC is bound by GATT rules, including manioc, corn gluten feed, corn germ cake, citrus pulp, and brewers' and distillers' grains. The other group consists of those products for which the EC is not bound by GATT, including brans and sharps, which are byproducts from the grain milling industry (12).

To legally justify import restrictions on certain nongrain feeds, the Commission has considered invoking one or more of the following GATT provisions:

- o Article 6: Antidumping and countervailing duties;
- o Article 11: Quantitative restrictions;
- o Article 12: Restrictions to preserve the balance of payments;
- o Article 19: Emergency action on imports of particular products (safeguard clause);
- o Article 20: General exceptions; and
- o Article 28: Schedule modification (unbinding).

The Council of Agricultural Ministers approved negotiations in GATT to stabilize imports of corn byproduct feeds as part of the package of CAP reforms on which the Council agreed on March 31, 1984. Tariff concessions are renegotiated in accordance with Article 28 of the GATT. Article 28 allows for the negotiation of compensation by any country that wishes to withhold, withdraw, and/or modify previous tariff or other trade concessions. In this case, the EC is required to negotiate with the main supplier holding negotiation rights--the United States in the case of corn gluten feed.

EFFECTS OF PROPOSED REFORM MEASURES ON NONGRAIN FEEDS

A number of recent studies analyze the economic effects of the proposed measures for reforming the CAP. Some of these studies concentrate on nongrain feeds, or

the cereal substitute issue. Others evaluate the effects of import restrictions on nongrain feeds and/or price reductions for EC cereals. This section summarizes the results of these studies.

The European Feed Manufacturers' Federation Study

FEFAC (20) studied EC imports of feed ingredients in response to the EC Commission's proposal to restrict imports of various feeds. With regard to the role of nongrain feeds in livestock feed rations, the study concluded that manioc is the only imported feed ingredient that deserves the label "cereal substitute." Because of its high energy content and favorable price, manioc has displaced some cereals in EC feed rations. This displacement and the increasing share of cattle feeds in total EC feed production have reduced cereal use in compound feeds. Cattle feeds contain mostly industrial residues and little to no cereals.

The study also noted that most other imported industrial residues used in animal feed, especially corn gluten feed and citrus pulp, have not substituted for cereals in compound feedstuffs but have substituted for other ingredients with similar feed value, depending on prevailing prices. Corn gluten feed mainly replaced secondary cakes, such as copra and palm kernels, and wheat brans. The progress of citrus pulp use was mainly at the expense of beet pulp and brans.

FEFAC does not believe that the EC Commission's proposals to restrict imports of various feed ingredients will solve the EC surplus grain problem, which is due to the high CAP price guarantees that have stimulated production and slowed consumption. Reforming EC cereal policies by limiting price increases and aligning EC prices with world levels is FEFAC's solution to the surplus problem.

U.S. Agricultural Attache Studies

Studies by U.S. agricultural attaches of USDA's Foreign Agricultural Service focused on the substitutability of feed ingredients in Dutch and German compound feeds as prices varied (48, 49, 50, 51). 9/ These studies basically supported the conclusions of the FEFAC study. The general findings were as follows:

- o Corn gluten feed competes with protein meals rather than with grains in Dutch and German dairy rations by substituting for coconut and palm kernel meal and, to a lesser extent, soybean meal.
- o Citrus pulp, primarily used in dairy rations, substitutes for EC-produced beet pulp, which has similar nutritional qualities.
- o Manioc substitutes for grain. At present prices, manioc is a major feed ingredient, competing with grain in Dutch and German rations for swine and poultry. It is not particularly important in Dutch and German cattle rations.
- o If imports of corn gluten feed were banned, other proteins would substitute, particularly soybean meal and copra meal in cattle rations. Grain consumption would increase marginally, if at all.

9/ The analysis was carried out with computer programs actually used by German and Dutch feed compounders for determining least-cost feed rations under hypothetical price and import conditions.

- o If EC grain prices were lowered to world levels, grain use would increase sharply, particularly in swine and poultry rations, use of manioc and citrus pulp would drop off, and use of corn gluten feed would decline moderately.
- o A restrictive import policy on selected nongrain feed ingredients would raise imports of other feed products also bound at low or zero duties.
- o If the EC intends to stimulate consumption of homegrown grains through limiting imports, it has to restrict imports of all nongrain feed ingredients.

Surry and Moschini Study

Surry and Moschini (43) studied input substitution in the EC compound feed industry. They specified a translog cost function of compound feed production with three inputs (cereals, cereal substitutes, and high-protein feeds) and three outputs (cattle, hog, and poultry feeds). The model was estimated using cross-sectional, time-series data of the Belgian and Dutch compound feed industries for 1961-78. The following are the results:

- o All direct price elasticities (percentage change in demand for a 1-percent change in price) for each input have absolute value between zero and 1, indicating an inelastic (low) response to price.
- o Cereal substitutes (brans, cassava, molasses, and citrus pulp) and high-protein feeds (soybean meal, other oilcakes, animal meal, and corn gluten feed) are complements. ^{10/}
- o Both cereal substitutes and high-protein feeds substitute for cereals (wheat, barley, and corn).

The low response of each input is likely due to the aggregation of many individual feeds into only three groups, reducing the number of available substitutes. The policy implication of the study's elasticity estimates is that raising prices of all high-protein feeds or cereal substitutes through some form of trade intervention or consumption tax will increase cereal consumption but less than an equivalent percentage reduction in cereal prices.

Leuck Study

In a study of the EC feed-livestock sector, Leuck (30) used results from both econometric models and linear programming models to assess the effect of selected EC pricing policies. The relationships among the feeds in this study are as follows:

- o In pig and poultry rations, corn gluten, cassava (manioc), and oilseed meal complement each other and, along with other nongrain feeds, substitute for grain.
- o In dairy rations, corn gluten substitutes for both grains and oilseed meal.

^{10/} Unlike the EC Commission, Surry and Moschini list corn gluten feed as a high-protein feed rather than as a cereal substitute.

- o Overall, cassava and corn gluten complement one another and together substitute for grains. Cassava and oilseed meal complement one another, also substituting for grains.

From discussions with European feed experts, the following rations were determined to substitute for 1 ton of grain:

- o 600 kilograms of cassava + 400 kilograms of corn gluten feed.
- o 800 kilograms of cassava + 200 kilograms of oilseed meal.

Leuck used the two rations to derive an aggregate relationship among cassava, corn gluten feed, grains, and oilseed meal.

One of the EC policy proposals Leuck addressed was the convergence of EC grain prices to world levels without reductions in livestock prices. Because Leuck's model did not contain price-responsive demands for nongrain feeds, the effect of the price change was evaluated at two extreme cases:

- o Nongrain feeds were assumed to be consumed at historical (1979) levels; and
- o Nongrain feeds were eliminated from use.

In the first case, lowering EC grain prices to world levels causes EC grain use to rise around 4.3 million tons and soybean meal use to rise 7 million tons. In the second case, grain use increases 12.4 million tons and soybean meal use increases 6.9 million tons, implying that nongrain feeds are replaced entirely with grains.

McKinzie, Paarlberg, and Huerta Study

McKinzie, Paarlberg, and Huerta (31) estimated a complete set of own- and cross-price elasticities for feed ingredients in the Netherlands using the "pseudo data" approach. They used the elasticity estimates to interpret the interrelationship between feed ingredients and to evaluate the implications of these estimates in the context of EC proposals to impose trade restrictions on nongrain feed.

The estimation technique used least-cost feed ration models for three types of livestock feed (broiler, dairy, and swine) to generate three sets of pseudo demand data from a sample of different feed ingredient prices. A least-squares curve-fitting procedure was used to approximate derived demand relationships for the generated data. The major substitute and complement feed relationships that emerge from the application of this technique are as follows:

- o Swine rations. Wheat, coarse grains, corn gluten feed, grain byproducts, and manioc are substitutes. Corn gluten meal, grain byproducts, and animal proteins tend to substitute for oilmeal with animal protein the "best" substitute for oilmeal. Oilmeal and manioc are complements as are oilmeal and wheat.
- o Dairy rations. Corn gluten feed and citrus pulp are complements, and each are substitutes for either molasses or dried brewers' grains, which also display a complementary relationship. Grains substitute for corn gluten feed, citrus pulp, and molasses and complement dried brewers' grains. Oilmeal is a strong substitute for dried brewers' grains.

- o Broiler rations. Oilmeal and manioc are complements. Wheat substitutes for oilmeal but complements animal proteins. Coarse grains complement oilmeal but substitute for animal proteins. Corn gluten feed complements coarse grains but substitutes for wheat. Manioc substitutes for both wheat and corn.

Signs on elasticities of some feeds change across feed rations, making it difficult to interpret the effect of a price change at the aggregate market level. The authors, therefore, computed a set of own- and cross-price elasticities for the total Dutch compound feed industry by weighting individual feed elasticities across livestock rations. The aggregate elasticity estimates indicate the following:

- o Wheat and coarse grains are nearly perfect substitutes.
- o Manioc, corn gluten feed, citrus pulp, animal protein, and corn gluten meal substitute for wheat and coarse grains.
- o Oilseed meal and dried brewers' grains complement wheat and coarse grains.
- o Grain byproducts substitute for wheat but complement coarse grains.

In terms of the implications of these elasticity estimates for policy analysis, the study concluded that import restrictions against a specific commodity, such as corn gluten feed, would sharply curtail the commodity's usage but that the use of other nongrain feeds would rise accordingly. Thus, to stimulate EC grain consumption in feed rations, imports of all current and potential substitutes must be restricted or grain prices must be lowered relative to other feeds.

Hillberg Study

Hillberg (28) used a simulation model of the West German manufactured feed economy to evaluate EC measures to restrict imports of "grain substitutes" and to lower domestic grain prices. The model consisted of two sets of least-cost linear programming models, representing West German feed demands; a system of equations for import supply of grain substitutes and soybean meal; and a set of demand equations for mixed feeds.

The results indicate that restricting imports of grain substitutes slightly increases grain demand by West German feed manufacturers. Import quotas on manioc reduce its use and increase grain use, especially in northern German swine and broiler rations. However, higher feed costs resulting from the quotas reduce demand for finished rations, thus moderating the substitution of grain for manioc. Import quotas on corn gluten feed reduce its use and increase use of soybean meal and barley. A reduction in grain prices increases grain use without significantly altering nongrain feed use. Lower grain prices are followed by a decline in nongrain feed prices, lowering the cost of finished rations and increasing their demand.

In terms of substitution relationships, manioc combined with soybean meal has the characteristics of a grain substitute, while corn gluten feed appears to act more like a protein feed.

De Veer Study

In a study of the welfare effects of various EC market regulations, de Veer (17) addressed the cereal substitute problem. He found that developments in processing technology, management systems, optimizing techniques, nutrition, transportation, and the wide variety of raw materials available to feed compounders have increased the substitution among feeds and expanded opportunities for evading the price-increasing effect of the CAP on cereals. Although indicating precisely which materials are substitutes for cereals is difficult due to the complex nature of feed formulation, certain feedstuffs are associated with the drop in EC cereal use.

From a list of feasible feed mixtures, corn gluten feed was shown to be a strong substitute for soybean meal and both a complement and a slight substitute for corn. Cassava (or manioc) is a strong substitute for corn and a complement for soybean meal and corn gluten feed.

De Veer stated that importing cereal substitutes free of duty has increased EC budgetary costs and led to welfare losses due to negative terms of trade and inefficient trade flows. Although he admits that import restrictions are "not nice instruments," he claimed they would be effective in reducing the budgetary cost of the CAP and mitigate the downward pressure on EC cereal prices. However, De Veer warned that import barriers of any form would likely bring retaliation from exporters, particularly the United States, and cause severe hardship for some developing countries, such as Thailand. He concluded that restricting feed imports would be difficult because of conflicting interest in the EC and likely response from exporters, even though import restrictions would be in the interest of the EC.

Gardiner Study

Gardiner (24) developed a three-region (United States, EC, and rest of the world) econometric model of the markets for corn, wheat, and soybeans to analyze the market effects of alcohol fuel production from corn. The study accounted for the interactions between corn byproduct feeds (corn gluten feed, corn gluten meal, and distillers' dried grains) and corn and soybean meal by incorporating feed ration results from studies by Chattin (7) for the United States and by Hillberg (27) for the EC. Alcohol fuel production levels of 1.1, 2, and 3 billion gallons were analyzed under three alternative trading environments for corn gluten feed:

- o Unrestricted trade in corn gluten feed,
- o An EC import quota of 3 million tons on corn gluten feed but unrestricted trade in nonmember markets, and
- o An EC import quota of 3 million tons on corn gluten feed and restricted trade in nonmember markets.

The results of this study indicate that increased supplies of corn byproduct feeds from alcohol fuel production displace corn, soybean meal, and other feeds from livestock rations in all three regions. The price-increasing effects of using corn to produce alcohol fuel are somewhat moderated by the larger supplies of corn byproduct feeds, which also lower soybean meal prices. The lower soybean meal prices, while benefiting feed compounders, livestock producers, and importers, reduce crushing margins for soybean processors. Increased imports of

corn byproduct feeds by the EC and the rest of the world reduce U.S. exports of both corn and soybean meal.

An EC import quota on corn gluten feed of 3 million tons reduces U.S. sales of corn gluten feed to the EC and lowers income to U.S. ethanol producers and other corn millers. Lower EC imports of corn gluten feed are partially offset by increased imports of corn and soybean meal for feed purposes. The quota also slightly depresses prices of corn and soybean meal. Because the model did not include all the other nongrain feeds and protein meals available to the EC market, the quota on corn gluten feed would likely increase EC imports of other feeds, especially those with no trade restrictions, and consequently, have a smaller impact on corn and soybean meal imports.

CONCLUSIONS

The nongrain feeds, or "cereal substitutes," issue highlights the problems of conflicting policies within the CAP, divergent interests within the EC, and disputes over market access between the EC and exporting countries. EC officials claim that proposals, such as quotas and levies, for dealing with nongrain feed ingredients address surplus production and budget expenditures. Empirical evidence suggests that the EC will not solve its budgetary problems by restricting imports of selected nongrain feeds. Cutting agricultural support measures and allocating a larger share of VAT receipts to the CAP may be necessary.

Current practices of compound feed production suggest that restricting imports of selected nongrain feeds, such as corn gluten feed, will not ensure that compounders will switch to grains, thereby reducing EC grain surpluses. Compounders would likely increase use of other nongrain feeds and oilseed meals. Evidence suggests that if the EC wants to significantly increase the use of EC-produced grain, it will have to lower grain prices. Import restrictions without lower grain prices would certainly raise imported feed costs and would be a financial burden to the compound feed industry, the livestock industry, and consumers of livestock products. Import restrictions without compensation to exporters would contravene the principles of the GATT and would likely bring retaliation. Arriving at a mutually acceptable compensation for the reduced export market for nongrain feeds will be difficult. One issue is how to measure the EC's impairment of the concessions given to various nongrain feeds in previous rounds of GATT negotiations. For supplier countries, an important issue is how to fix compensation on prospective trade.

The EC's grain and dairy surpluses have no easy and fast resolution. The imbalance between consumption and production is one of structural overproduction. Consumption of grains and dairy products has not changed much since the early 1970's and probably will not in the near future. Guarantee thresholds, which have slowed grain price increases in recent years, have not succeeded in checking grain production, and stocks still remain at burdensome levels. Significant declines in real grain prices or stringent production controls will be required to reduce grain surpluses. Land diversion schemes are even being considered as possible solutions to surplus crop production.

The introduction of milk quotas in 1984 represents an attempt to address dairy surpluses. The program succeeded in cutting milk production in its first year. However, EC stocks of dairy products, especially butter, are still large and are depressing world prices. Recent sales of 181,500 tons of EC butter to the USSR

at a subsidy of more than \$3,200 per ton represent frantic attempts by the EC to reduce its butter surplus. These short-term remedies will prove futile if butter stocks are allowed to accumulate again. Successes in reducing dairy surpluses will depend on compliance with milk quotas by EC members and a reduction or slower growth in milk and dairy product prices.

The supply of corn gluten feed will depend mainly on the demand for starch, corn sweeteners, and corn-based ethanol. Projections made by the U.S. corn wet-milling industry indicate that the U.S. corn sweetener market has reached maturity and expansion will be at a slower pace than in the 1970's. Decreased Federal funding for U.S. ethanol production and low petroleum prices have discouraged major expansion in the ethanol industry in recent years. Unless Federal subsidies, which are scheduled to expire December 31, 1992, are extended, fuel alcohol production will be terminated or sharply reduced.

U.S. exports of corn gluten feed will depend on its relative profitability as an ingredient in EC and U.S. livestock rations. EC import volume of corn gluten feed over the past 15 years demonstrates its importance as an ingredient in EC compound feeds. CAP reform measures, designed to reduce EC livestock and grain surpluses, have contributed to a softer market for corn gluten feed and other nongrain feeds since 1982.

The issue of cereal substitutes will continue to be a factor in the EC's ongoing process of reforming the CAP. It is also likely to remain high on the EC's agenda during the Uruguay round of GATT negotiations.

REFERENCES

1. Agra Europe Ltd. Agra Europe. Weekly Newsletter on Agriculture in the European Community. London, various issues.
2. _____. C.A.P. Monitor. London, 1986.
3. _____. "Development of the Animal Feed Industry in Europe: 1985-1994," Agra Europe Special Report, No. 23, London, 1985.
4. Allen, Richard D. "Feedstuffs Ingredient Analysis Table: 1987 Edition," Feedstuffs, Vol. 59, No. 31, Minneapolis, July 29, 1987.
5. Australian Bureau of Agricultural Economics. Agricultural Policies in the European Community: Their Origins, Nature and Effects on Production and Trade. Policy Monograph No. 2. Canberra: Australian Government Publishing Service, 1985.
6. Bale, M. D., and E. Lutz. "The Effects of Trade Intervention on International Price Instability," American Journal of Agricultural Economics, Vol. 61, Aug. 1979, pp. 512-16.
7. Chattin, Barbara L. "By-product Utilization from Biomass Conversion to Ethanol." Ph.D. dissertation. Purdue University, Dec. 1982.
8. Commission of the European Communities. The Agricultural Situation in the Community. Brussels, various years.
9. _____. "Use of Substitute Products in Livestock Feeding," Internal Information on Agriculture, No. 130, Brussels, May 1974.
10. _____. "Guidelines for European Agriculture," Communication from Commission to Council. COM(81) 608. Brussels, Oct. 23, 1981.
11. _____. Official Journal of the European Communities: Legislation, Vol. 24, Brussels, Nov. 23, 1981.
12. _____. "Changes to the Conditions under which Certain Products for Use as Animal Feed are Imported into the Community," Communication from Commission to Council. COM(82) 175 final. Brussels, Apr. 19, 1982.
13. _____. "EC Community Milk: The Quota System," Green Europe Newsletter, No. 203, Brussels, 1984.
14. _____. Official Journal of the European Communities: Legislation, Vol. 28, Brussels, Dec. 9, 1985.
15. _____. Agricultural Prices 1986/1987 Commission Proposals. Brussels, May 2, 1986.
16. Corden, W. M. The Theory of Protection. Oxford: Clarendon Press, 1971.
17. De Veer, Jan. "Cereal Substitutes, Fat Tax and Price Distortion," European Review of Agricultural Economics, Vol. 11-2, 1984, pp. 169-76.

18. Ensminger, M. E., and C. G. Olentine, Jr. Feeds and Nutrition - Complete, First Edition. Clovis, CA: Ensminger Publishing Company, 1980.
19. European Community News Flash. "Agricultural Prices 1986/1987 Commission Proposals," Brussels, May 2, 1986, p. 35.
20. European Feed Manufacturers' Federation (FEFAC). Statistical Analysis of the Use of So-Called Cereal Substitutes. (82) B/17. Brussels, June 25, 1982.
21. _____. Feed and Food Statistical Yearbook. Brussels, various years.
22. Food and Agriculture Organization of the United Nations. Production Yearbook. Rome, various years.
23. Gardiner, Walter H. "Feed Utilization in the European Community," paper presented at the World Soybean Research Conference III, Iowa State University, Aug. 13, 1984.
24. _____. "The Impact of Alcohol Fuel Production on Agricultural Markets." Ph.D. dissertation. Purdue University, May 1986.
25. Harris, S., K. Parris, C. Ritson, and E. Tolleus. The Renegotiation of the ACP-EEC Convention of Lome. Commonwealth Secretariat, 1979.
26. Herlihy, M., S. Magiera, G. Hasha, and D. Kelch. EC Grains, Oilseeds, and Livestock: Selected Statistics, 1960-80. SB-703. U.S. Dept. Agr., Econ. Res. Serv., Dec. 1983.
27. Hillberg, Ann Marie. "The Impact of European Economic Community Recommendations to Limit Grain Substitutes Imports on the West German Manufactured Feed Economy." M.S. thesis. Purdue University, May 1984.
28. _____. "Limiting EC Grain Substitute Imports: A Simulation Model of the West German Manufactured Feed Economy," European Review of Agricultural Economics, Vol. 13, 1986, pp. 43-56.
29. ISTA Mielke GMBH. Oil World. Hamburg, various issues.
30. Leuck, Dale J. "An Analysis of the Feed-Livestock Sector of the European Community." ERS Staff Report No. AGES840529. U.S. Dept. Agr., Econ. Res. Serv., Jan. 1985.
31. McKinzie, Lance, P. L. Paarlberg, and I. P. Huerta. "Estimating A Complete Matrix of Demand Elasticities for Feed Components Using Pseudo Data: A Case Study of Dutch Compound Livestock Feeds," European Review of Agricultural Economics, Vol. 13, 1986, pp. 23-42.
32. National Research Council of the United States, and Department of Agriculture of Canada. Atlas of Nutritional Data on United States and Canadian Feeds. Washington, DC: National Academy of Sciences, 1971.
33. _____. Nutrient Requirements of Poultry. 7th edition. Washington, DC: National Academy of Sciences, 1977.

34. _____. Nutrient Requirements of Dairy Cattle. 5th edition. Washington, DC: National Academy of Sciences, 1978.
35. _____. Nutrient Requirements of Swine. 8th Edition. Washington, DC: National Academy of Sciences, 1979.
36. Neville-Rolfe, E., C. Caspari, G. Hobhouse, D. MacLaren, and D. Chamier. "Feed Use and Feed Conversion Ratios for Livestock in the Member Countries of the European Community." IED Staff Report, U.S. Dept. Agr., Econ. Stat. Coop. Serv., Jan. 1980, pp. xxi-3.
37. _____, and Kenneth Thomson. "Cereal Supply Control in the European Community," Agra Europe Special Report, No. 25, June 1985.
38. Nordlund, D. E. "Testimony given before the House Agriculture Subcommittee on Wheat, Soybeans and Feed Grains," U.S. House of Representatives, Oct. 4, 1983.
39. Paarlberg, Philip. "The Development of A Linear Programming Model for the Dutch and British Swine and Broiler Feed Compounding Industries." Unpublished paper. U.S. Dept. Agr., Econ. Stat. Coop. Serv., Mar. 1979.
40. Peterson, E. Wesley. "The Effect of Trade Restrictions on Demand for Imported Feed Ingredients in France," North Central Journal of Agricultural Economics, Vol. 8, No. 2, July 1986, pp. 243-55.
41. Statistical Office of the European Community (EUROSTAT). Analytical Tables of Foreign Trade, NIMEXE. Brussels, various years.
42. _____. Animal Production, No.4, Luxembourg, 1983.
43. Surry, Ives, and Giancarlo Moschini. "Input Substitutability in the EC Compound Feed Industry," European Review of Agricultural Economics, Vol. 11-4, 1984, pp. 455-64.
44. Terpstra, A. E. The Importance of U.S. Corn Gluten Feed Exports. Congressional Research Service, Library of Congress, Oct. 1981.
45. Toepfer International. Statistische Information: Grain and Feeding Stuffs Market Statistics. Hamburg, Germany, 1984.
46. _____. The EEC Grain Market Regulation. Hamburg, various years.
47. U.S. Department of Agriculture, Foreign Agricultural Service. Report on Agricultural Concessions in the Multilateral Trade Negotiations. M-Series, FAS-M-301. June 1981.
48. _____, Foreign Agricultural Service. The Netherlands: Utilization of NGFI in the Netherlands. Attache Report NL-3150. The Hague, Nov. 25, 1983.
49. _____, Foreign Agricultural Service. Nongrain Feed Ingredients. Attache Report GE-4105. Bonn, Feb. 3, 1984.

50. _____, Foreign Agricultural Service. Competitive Position of Nongrain Ingredients Versus Grain in Mixed Feeds. Attache Report GE-4111. Bonn, Feb. 13, 1984.
51. _____, Foreign Agricultural Service. Feed Utilization in the Netherlands Under Varying Price Assumption. Attache Report NL-4033. The Hague, Mar. 8, 1984.
52. _____, Foreign Agricultural Service. Tapioca Pellet Inquiry. Attache Report TH-2587. Bangkok, Apr. 1, 1984.
53. _____, Office of Energy. Fuel Ethanol and Agriculture: An Economic Assessment. AER-562. Aug. 1986.
54. Watson, Stanley A. "Industrial Utilization of Corn," Corn and Corn Improvement. Ed. G. F. Sprague. Madison, WI: American Society of Agronomists, 1977, pp. 721-63.
55. Weindlmaier, H., and E. Krebs. "A Prognosis and Simulation Model of the EC Cereals Market, Part II," Information on Agriculture, No. 80, Commission of the European Communities, Dec. 1980, pp. 15-17.

Appendix table 1--Average composition of selected feeds ^{1/}

International :		Dry	Crude	Crude	Ether ^{2/} :			TDN	Metabolizable energy		
feed number :	Commodity	matter	protein	fiber	extract	Calcium	Phosphorus	Cattle	Cattle	Poultry	Swine
		Percent						Mcal/kg.			
4-00-549	: Barley	: 89	11.6	5.1	1.8	0.03	0.36	83	3.24	2.64	2.87
4-00-668	: Molasses, beet	: 79	6.1	0	0	.13	.06	75	2.89	1.99	2.32
4-00-669	: Sugar beet pulp	: 91	8.0	21.0	.5	.60	.10	78	3.02	-	2.35
4-01-152	: Manioc meal	: 91	2.9	4.9	.7	.15	.03	79	2.87	-	3.38
4-01-237	: Citrus pulp	: 90	6.9	14.0	3.4	2.10	.13	77	2.98	-	-
4-02-935	: Corn, yellow	: 89	8.8	2.2	3.8	.02	.28	80	3.11	3.43	3.33
4-05-190	: Wheat bran	: 90	15.7	11.0	3.0	.14	1.15	70	2.67	1.30	2.32
4-05-337	: Wheat, soft	: 89	10.2	2.4	1.0	.05	.31	88	3.47	3.12	3.42
4-08-536	: Sweetpotatoes	: 90	5.4	3.7	1.0	.17	.16	-	2.91	-	3.31
5-01-572	: Coconut meal	: 93	22.0	12.0	6.0	.17	.60	77	-	1.49	2.50
5-02-141	: Brewers' dried	:									
	: grains	: 92	25.3	15.3	6.2	.29	.52	66	2.49	2.08	1.71
5-02-843	: Corn distillers'	:									
	: dried grains	:									
	: with solubles	: 92	27.2	9.1	9.0	.17	.72	88	3.47	2.48	3.39
5-02-903	: Corn gluten feed	: 90	22.0	8.0	2.5	.4	.80	82	3.19	1.75	2.40
5-03-871	: Rapeseed meal	: 92	36.0	13.2	2.6	.66	.93	64	-	1.77	2.70
5-04-604	: Soybean meal	: 89	44.0	7.3	.8	.29	.65	81	3.15	2.23	3.09
5-09-318	: Corn gluten meal	: 90	60.0	2.5	2.5	.02	.70	863	-	3.85	-
5-25-552	: Corn germ meal	: 90	20.0	12.0	1.0	.30	.50	70	-	1.69	-

- = Not available.

Mcal/kg = Million calories per kilogram.

TDM = Total digestible nutrients.

^{1/} As-fed basis for dry matter, all other nutritional factors on a dry basis.^{2/} Crude fat.

Sources: Manioc meal and sweetpotatoes (32), coconut (copra) meal, rapeseed meal, and corn germ meal (4), all other commodities (33, 34, 35).

Appendix table 2--Common customs tariff rates 1/ for selected nongrain feed ingredients

Common customs tariff code	Commodity	Duty
07.06 A	Manioc:	
I	Fresh or dried, whole or sliced	6 percent <u>2/</u> below quota, levy for barley above quota
II	Other, including pellets	6 percent <u>2/</u> below quota, levy for barley + 3.02 ECU/ton above quota
07.06 B	Sweetpotatoes	6 percent <u>3/</u>
11.04 C II	Manioc flour	1.61 x levy for corn + 20.55 ECU/ton
23.02 A I	Bran of corn or rice:	
a	With maximum of 35 percent starch content	
	by weight	0.14 x average levy wheat + barley + corn + 6 ECU/ton
b	Other	0.30 x average levy wheat + barley + corn + 6 ECU/ton
23.02 A II	Bran of other cereals (mostly wheat)	
a	With maximum of 28 percent starch content	
	by weight	0.14 x average levy wheat + barley + corn + 6 ECU/ton
b	Other	0.30 x average levy wheat + barley + corn + 6 ECU/ton
23.03 A II	Corn gluten feed	Free <u>2/</u>
23.03 B	Beet pulp	Free <u>2/</u>
23.03 B II	Brewers' and distillers' grains	Free <u>4/</u>
23.04 B	Oilcakes (including corn germ cake)	Free <u>2/</u>
23.06 A I	Grape marc:	
a	Maximum alcoholic strength by mass of 4.3 percent and minimum dry matter content of 40 percent by weight	Free <u>5/</u>
b	Other	2.03 ECU/kilogram of alcohol
23.06 A II	Other fruit waste (including citrus pulp)	Free <u>1/</u>

1/ Customs duties applicable to imports originating in countries that are contracting parties to the GATT or with which the EC has concluded agreements containing most-favored-nation tariff clause.

2/ Consolidated under GATT.

3/ Duty rate reduced to 3 percent (suspension) for an indefinite period.

4/ If protein content calculated on the dry product is less than 40 percent by weight.

5/ Under certain conditions, a countervailing tax is provided for in addition to the customs duty.

Sources: (1, Apr. 2, 1982; 11; 14).

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